OCTOBER 27, 1958

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

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- New Trend in College Recruiting . . . Page 38

A Special Study:

COPPER AND ITS ALLOYS . . . Page 75

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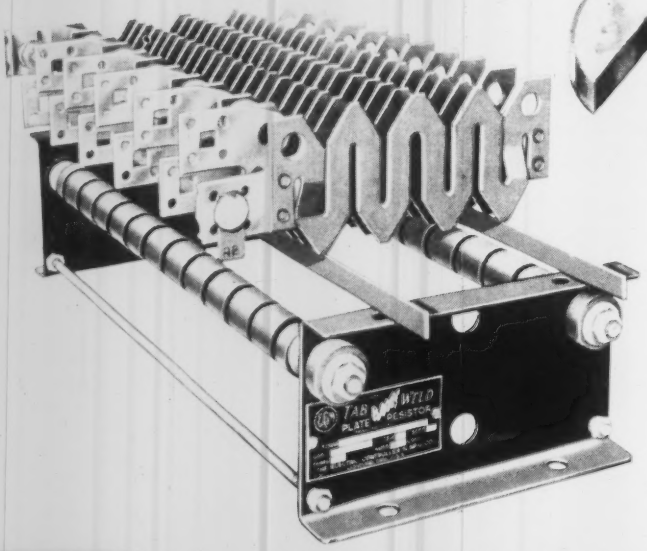
HANDS OFF!

EC&M TAB-WELD RESISTORS REQUIRE *MINIMUM* MAINTENANCE

Only EC&M TAB-WELD PLATE RESISTORS are both bolted and welded for constant current path Unlike other resistors, they do not require periodic tightening of clamping nuts to compensate for loss of pressure caused by alternate heating and cooling. Grids are offset and mating ends are spot welded. Tap-plates are also welded into place at close intervals along the grid assembly.

This exclusive EC&M construction offers **4** big advantages on heavy duty motor applications: (**1**) stabilized ohmic value (**2**) no burning at grid-eyes or at tap-plates (**3**) easy tap-shifting for best motor performance and (**4**) long life with virtually no maintenance!



FEATURES THAT REALLY COUNT!

- Nonbreakable
- Corrosion-resistant alloy steel
- Negligible resistance change between cold and maximum working temperatures
- Offset resistor ends spot-welded
- No burning at grid-eyes
- No burning at taps
- Small adjustments in resistance value easily made
- Insulating spacers remain dimensionally stable
- No periodic tightening of clamping nuts
- All standard sections same size
- Double insulation to ground
- Fast connection to any tap-plate

Write for illustrated Bulletin 6715
Complete data on EC&M TAB-WELD RESISTORS

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

7404-R

XXX

This is the thirtieth of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many in this field, including men of broad experience who may find it useful to review fundamentals from time to time.

Evaluating the Machinability of Alloy and Carbon Steels

To produce a useful part, most steel has to be shaped by one or more of the metal forming methods. One of these is metal cutting or machining, which changes the shape, size, or finish of a workpiece.

Alloy or carbon steels are often received from the mill in the raw form of bars, forgings, or castings. The steel is placed in a suitable machine, such as a lathe, multiple-spindle automatic bar machine, drill press, milling machine, or one of a number of other types. Metal is then removed from the steel stock until it has acquired the desired shape. This is accomplished by causing motion to take place in the sharp-edged cutting tool, or the piece of steel, while they are held in contact with each other. Cutting tools, such as drills, tool bits, milling cutters, and the like, are made from highly-alloyed steel (tool steel), cast alloys, sintered carbide, or even ceramic material.

During machining, the metal is removed in the form of chips which may be of any length, from the short, well-broken type, to the long, stringy and continuous variety—depending upon the nature of the steel, the shape or geometry of the cutting tool, the speed and feed at which the cutting is done, and the coolant or cutting fluid applied.

"Machinability" of steel refers primarily to the ease with which it can be reduced to its final shape. It is measured by the speed and feed at which it can be cut, the quality of the surface finish produced, the length of time the tools will last, and the kind of chip formed in cutting. In a "free-machining" grade of steel, for example, high speeds and feeds can be used, tools will stand up well, surface finish will be good, and chips well broken.

Machinability is evaluated in the shop by the number of pieces having a satisfactory finish, within the required dimensional tolerances, that can be produced in a shift, or a day, with adequate tool life.

It can be appreciated that the study of the cutting of metals involves a large number of variables. These may be grouped in the following way:

1. Steel Analysis (Process, composition, microstructure, and mechanical properties)
2. Machine Tool (Condition, tool accessories, range of cutting speeds and feeds with ample power, etc.)
3. Type of Machining Process (Turning, milling, forming, broaching, etc.)
4. Cutting Condition (Speeds, feeds, and depth of cut)
5. Cutting Tool (Composition, treatment, hardness, size, shape, grinding and surface finish)
6. Cutting Fluid (Characteristics, application, and volume)

From this number of complex factors, laboratory tests and investigations have developed experimental data by using single variables, such as steel analysis, tool analysis, tool shapes, and cutting fluids. This information has proved to be a useful guide when combined with industrial experience; for no test method by itself has yet been developed that will include all the characteristics of a specific single or multiple-machining operation.

Bethlehem metallurgical engineers have had long and varied experience and knowledge on the machinability of alloy and carbon steels. They will gladly give you any help you may require in connection with machining problems.

In addition to manufacturing all AISI standard alloy steels, Bethlehem produces other than standard analysis steels, and the full range of carbon grades. Call your nearest Bethlehem sales office for information.

If you would like reprints of this series of advertisements, please write to us, addressing your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa. The subjects in this series are now available in a handy 44-page booklet, and we shall be glad to send you a free copy.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

creative designing calls for an open mind

Leonardo Da Vinci's design for an odometer

Model courtesy of IBM

EVEN DA VINCI'S ODOMETER COULD HAVE BEEN BETTER WITH HELP FROM AN SKF ENGINEER.

An SKF engineer can afford to concentrate on your bearing problem rather than his own product line—because the SKF line includes all four types of ball and roller bearings in many thousands of sizes. This gives him the kind of flexibility he needs to keep an open mind on any bearing problem. Give your problem to SKF and see. 7836

Spherical, Cylindrical, Ball, and "Tyson" Tapered Roller Bearings

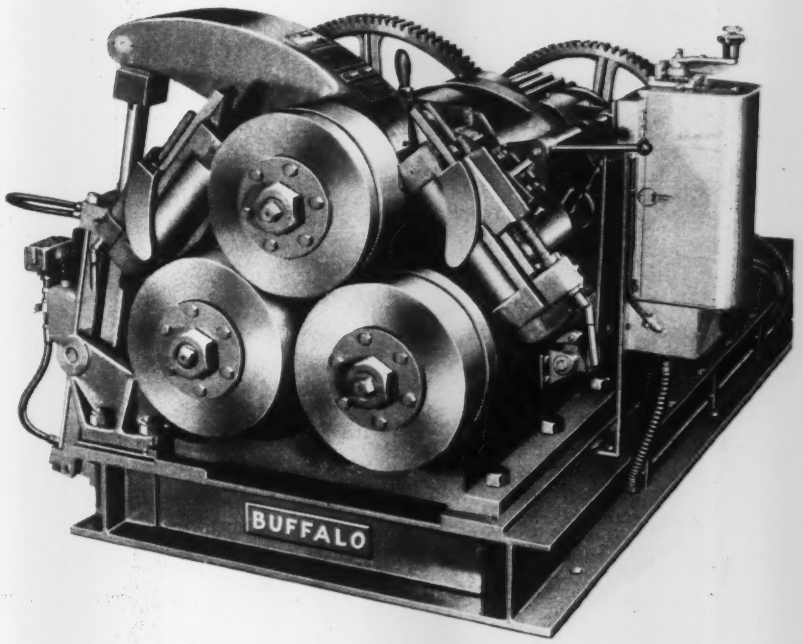
EVERY TYPE—EVERY USE

SKF®

SKF INDUSTRIES INC. PHILADELPHIA 32, PA.

REG. U.S. PAT. OFF.

Turn Your TOUGH Bending Jobs into PROFITABLE Operations with "BUFFALO" BENDING ROLLS



"Buffalo" Bending Rolls have taken production bending operations "out of the red" and put them "in the black" in literally hundreds of shops.

Fast, accurate and easily-operated, they are ideal for rapid circle, segment and spiral bending. Versatile, they handle angles, rounds, squares, tubes, beams, channels, flats and special shapes. Rolls are quickly and easily changed for different structural shapes and setup changes. With the unique "Buffalo" hydraulic adjustment for the top roll, the upper roll is effortlessly positioned or released to save vital setup time.

Exclusive "Buffalo" "Leg-In" Attachment saves you time and money! Difficult bending of angles leg-in is greatly speeded and simplified. Material will not twist or get out of square. This feature also acts as a gauge when rolling a number of circles to the same diameter.

Choose from a wide variety of "Buffalo" Bending Rolls in many sizes designed to handle a range of work from the heaviest members down to the smallest fabrication jobs. Call in your "Buffalo" machine tool dealer or use convenient coupon below.

"Buffalo" Machine Tools bring you the famous "Q" Factor — the built-in QUALITY which provides trouble-free satisfaction and long life.

ESTABLISHED 1877 "Buffalo" MEMBER N.M.T.B.A.

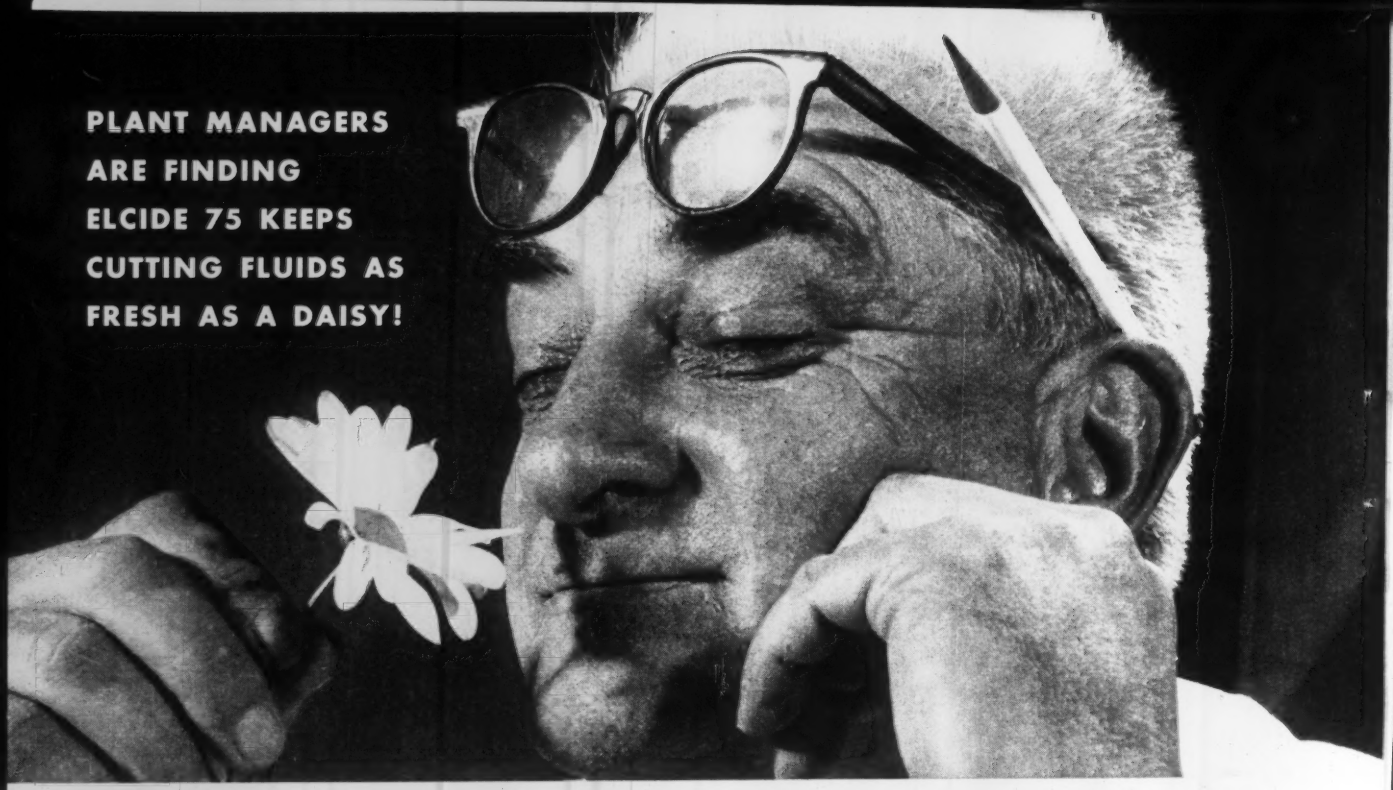
DRILLING
PUNCHING
SHEARING
BENDING

BUFFALO FORGE COMPANY

158 MORTIMER STREET • BUFFALO, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

I'd like more information on how I can cut costs—increase profits with "Buffalo" Bending Rolls.

NAME _____ TITLE _____
FIRM _____
STREET _____
CITY _____ ZONE _____ STATE _____



ELCIDE 75™ controls bacteria in soluble oil emulsions

...increases plant efficiency

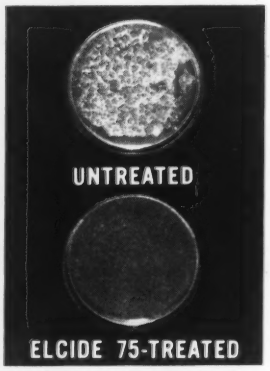
Elcide 75 extends the life of standard duty soluble oil emulsions. This longer emulsion life increases plant production and lowers operating costs.

Elcide 75 is a new bacterial inhibitor that controls a wider range of the harmful bacteria that cause emulsion breakdown, corrosion, and odor. This positive control means it is now possible to extend the life of standard duty emulsions up to 5½ times longer than ever before. This longer emulsion life decreases the down time previously spent for recharging, thereby increasing production and labor efficiency. Total soluble oil requirements are less, and waste-oil disposal becomes much less of a problem and expense.

Elcide 75 is safe to employees and machinery. Shop tests show it is nontoxic and safe, and it controls the bacteria that may cause acidic corrosion of machinery and staining of products.

Elcide 75 is more effective than commonly used single inhibitors because it is a combination of antibacterial agents, and includes a powerful new compound, one of the safest and most effective bacterial inhibitors used in medical surgery.

Bacterial plate counts prove the killing power of Elcide 75. The light areas shown in the photograph are harmful bacterial colonies that have built up in a normal untreated emulsion in 12 weeks. Notice the emulsion treated with Elcide 75 has been kept clean and clear.



Elcide 75 specifications: *Active Ingredients—Sodium Ethylmercuri Thiosalicylate (Thimerosal) and Sodium o-phenylphenate. Price per gallon—1 gallon polyethylene, $8.50, 5 gallon polyethylene, $8.00, 55 gallon stainless steel, $6.50. Sold only through selected distributors. For more information or to place your order, phone or write:*

ELCIDE 75™

PATENT PENDING

Lilly

Lilly's brand of bacterial inhibitor for cutting fluids

ELI LILLY AND COMPANY, AGRICULTURAL AND INDUSTRIAL PRODUCTS DIVISION, INDIANAPOLIS 6, INDIANA. TELEPHONE: MELROSE 6-2211

Visit us at Booth No. 2101 at the NATIONAL METAL EXPOSITION, Cleveland, Ohio...October 27 to 31

This Week in STEEL The Metalworking Weekly

October 27, 1958
Vol. 143 No. 17

EDITORIAL 33

The business uptrend shows every indication of continuing into '59. Are you ready for it? Can you afford the high price of obsolescent machines?

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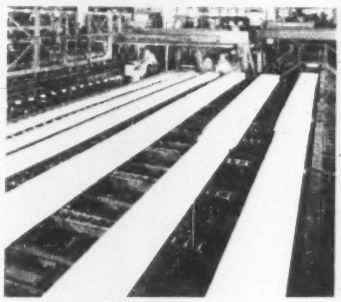

Last year, we presented a special 16-page study on stainless steels (STEEL, Nov. 4, p. 107) to launch a Trends in Metals series. This week, we present a comprehensive report on copper and its alloys.

WINDOWS OF WASHINGTON 42

You don't have to wait nearly as long for a patent to be processed as you did in 1956. Greater speed is planned.

MIRRORS OF MOTORDOM 49

Imports are taking almost 8 per cent of U. S. auto market. Renault counts on style to pass up Volkswagen.

THE BUSINESS TREND 53

Auto output adds zip to economy. Business indexes will regain most of lost ground by end of November.

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☑ Trends in Metals: Copper and Its Alloys 75
This special STEEL report covers 16 pages. Topics include: The supply and demand situation, uses and potentials, problems, research and development, and important statistics.
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STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1958 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

Rx FOR TIRED MACHINES

PATIENT: Style 215 Precision Boring Machine—built in 1939.

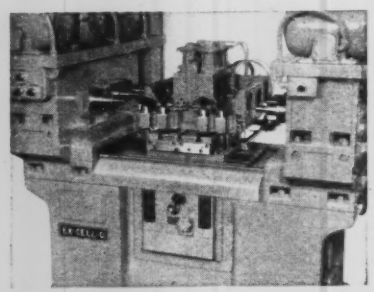
SYMPTOM: Speeds too slow for modern production, tooling outdated.

DIAGNOSIS: Continuous duty from 16 years of heavy work.

CURE: Ex-Cell-O Machine Renewal and Repair Service.

RECOVERY: Fast, complete, guaranteed.

FUTURE: Longer life, "like new" performance.

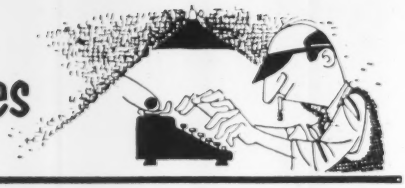


This 16-year-old Precision Boring Machine, recently rebuilt and retooled by Ex-Cell-O, is back on the job, giving profitable, "like new" service. Renewal or modernization of standard or special machines by Ex-Cell-O experts restores original precision and greatly extends the value of your investment. The service is quick, the workmanship thorough, and your complete satisfaction is guaranteed. Call your local Ex-Cell-O Representative, or write direct for full details.

XLO EX-CELL-O FOR PRECISION
58-52

EX-CELL-O CORPORATION
DETROIT 32, MICHIGAN

behind the scenes



STEEL Bows to Copper

You'd be surprised at where you can find copper. It has been discovered in blood, seaweed, straw, eggs, liver, and cheese, as well as in mines. Ancients found it in Cyprus, Cornwall, Peru, Michigan, and Montana, but do you know where Sir Arthur Herbert Church found it? Sir Arthur found it in the coloring matter of the wing feathers of the touraco, which, of course, is simply a corythaix erythrophilous.

"Astounding!" Sir Arthur exclaimed, after he had boiled down a mess of touraco wing feathers to get at the turacin, or coloring matter. "My word, this stuff is 6 per cent copper!"

Despite their copper wings, touracos can be found roosting on the tops of the highest trees in Africa—and copper and copper-based alloys can be found in a special STEEL study that begins on Page 75.

We will be first to admit that this is a pretty feeble introduction; maybe we're still thinking about last week's Metal Selector, and the transition from special alloys to copper and copper-base alloys leaves us rocking. However, today marks the opening of the Metal Show, and participants are reminded that STEEL's special copper study is available for distribution.

Exhaustive Report

The use of copper in the Old World has been widely documented. Everybody knows about the Bronze Age, and how the word copper was derived from a corruption of Cyprus, where the Romans got most of their copper supplies; how the Etruscans, Greeks, Cretans, and Egyptians fashioned ornaments and weapons from copper and copper alloys—but how many modern metallurgists can speak up about early American copper?

Well, they don't get much credit for it, but our 100 per cent, red-skinned American boys were knocking out copper ornaments and weapons, too, in the long, long ago. A foot-long copper flying eagle, dug out of an Ohio mound, has more copper in it than a trainload of Sir Arthur Herbert Church's touracos, but it never attracted as much attention from the metalllurgical world. And in this connection, it is safe to say that neither Sir Arthur's touracos nor Ohio's eagle will ever draw as much attention as STEEL's copper report.

This special study reveals the practices of metalworking executives in buying copper and copper-base alloys; it lists their likes and dislikes of these materials, their plans for future use of them, and any changes they think should be made in the qualities or forms of these materials.

It will show where these metals are most widely used, point out trends in methods of fabricating, and list sources of supply.

Teen-Agers View Science

The July Industrial Bulletin of Arthur D. Little Inc., Cambridge, Mass. (across the river from a town that venerates codfish, baked beans, and censors of morals), carried some teen-agers' views of science and scientists. According to the bulletin, Drs. Margaret Mead and Rhoda Metraux—there's something delightfully lilting about the name Rhoda Metraux, isn't there? Seems to go with Razz Matazz—well, anyway, these lady doctors went to work for the American Association for the Advancement of Science. They wanted to know what high school kids thought about scientists and their work. The answers were pretty good indications of how well the children had studied movies, television, and comic books.

The subjects of science, said the kids, include physics, chemistry, botany, astronomy, creepy and crawly things, geology, medicine, and archaeology. Mathematics is not a science, but a tool and a measure of scientific aptitude. All students agreed upon some aspects of the image of a scientist. He is a man (apparently never a woman) who wears a white coat and works in a laboratory; he is middle aged, and wears glasses. He is surrounded by a jungle gym of blown glass tubes and weird machines with dials; he spends his days pouring chemicals from one test tube into another, peering raptly through a microscope, or injecting serum into animals—and he writes neatly in a black noteback.

The only comfort we can derive from all this is that we can be assured of a steady supply of comic strip and television script writers far into the foreseeable future.

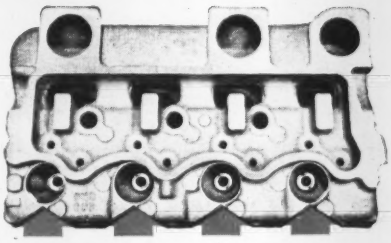
Tame Test for Turk

Here is a sentence made famous in World War I. It contains ten words, and is punctuated like this: 1 2 3 4 ? 5 6 7 8 9 10? The following definitions of the words are lifted from Webster's Collegiate Dictionary. Now then—shall we allors? 1. Approach. 2. In contact with. 3. Personal pronoun. 4. Illegitimates. 5. To bring about. 6. Personal pronoun. 7. Crave. 8. In the direction of. 9. Subsist. 10. Incessantly.

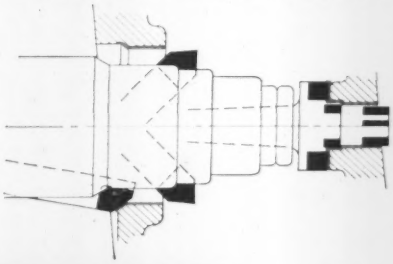
Before you complain about these easy ones, let us explain that a man in Istanbul told us he was tired of mathematics, that he wanted to take a whirl at definitions. You guessed it, of course; he is the lone whirling dervish on STEEL's circulation list.

Shirley

(Metalworking Outlook—Page 29)



MACHINES 21 CYLINDER HEAD SURFACES IN ONE PASS WITH DEPTH OF CUT BETWEEN 1/8" AND 3/16"
Rough castings are bored, plunge-faced and chamfered at a rate of 18 parts per hour. Tooling is shown below.



NEW!

Heavy-Duty Precision Boring Machine

From base to bridge-top, Ex-Cell-O's new Style 771 Precision Boring Machine is engineered to keep pace with changing production needs and built to give years of precise profitable performance.

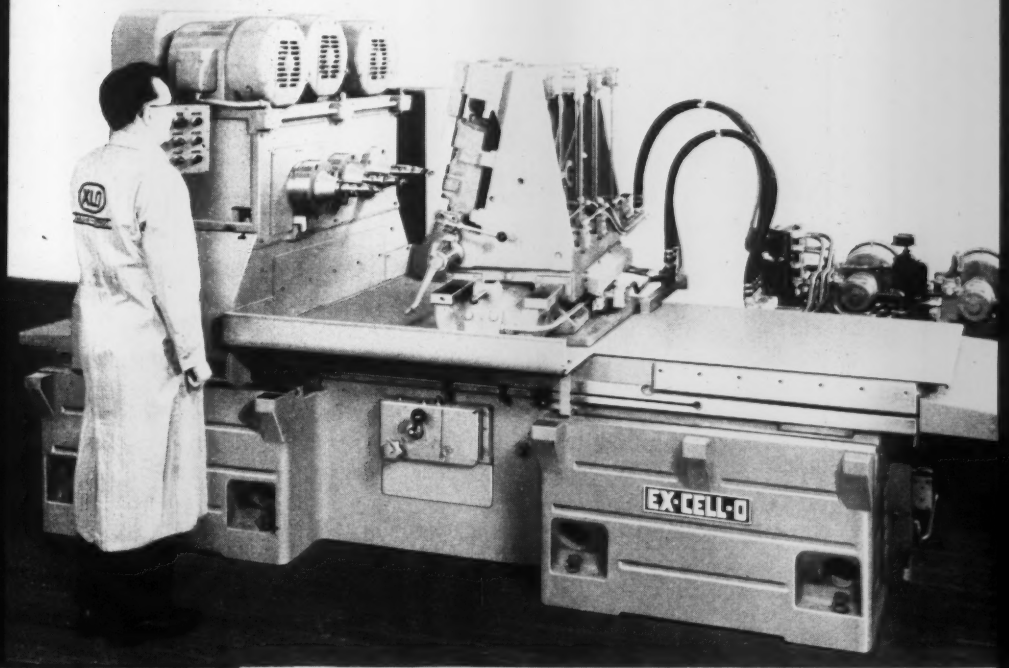
A specialist in fast, heavy-duty work such as the multiple machining operations detailed at left, the Style 771 (and the companion double-end Style 772) provides ample work space for complex tooling setups and bulky fixtures.

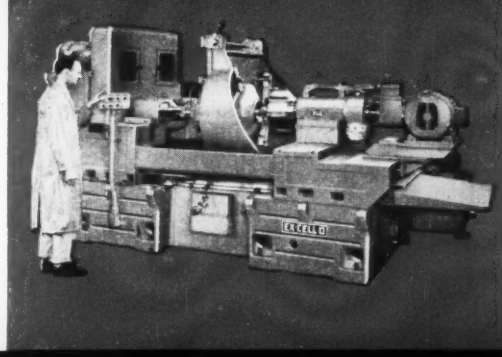
In-built versatility permits a broad range of rough, semi-finish and finish operations with automatic cycling. Rigid construction gives the "beef" needed for machining large, heavy parts, and supplies a wide margin of steadiness for high production of smaller precision parts.

Ex-Cell-O Precision Boring Machines can put greater precision into your products at lower per-unit cost. Get the full story from your local Representative, or write direct.

RIGHT: Style 771 machines both 4-and-6-cylinder tractor components. As cycle starts, table rapids to left, spindles rotate and feed traverse begins. At end of stroke, table rapids out to clear tooling; fixture indexes, cycle repeats for second set of holes.

BELOW: Double-end Style 772 performs multiple machining operations on tractor gear case cover.





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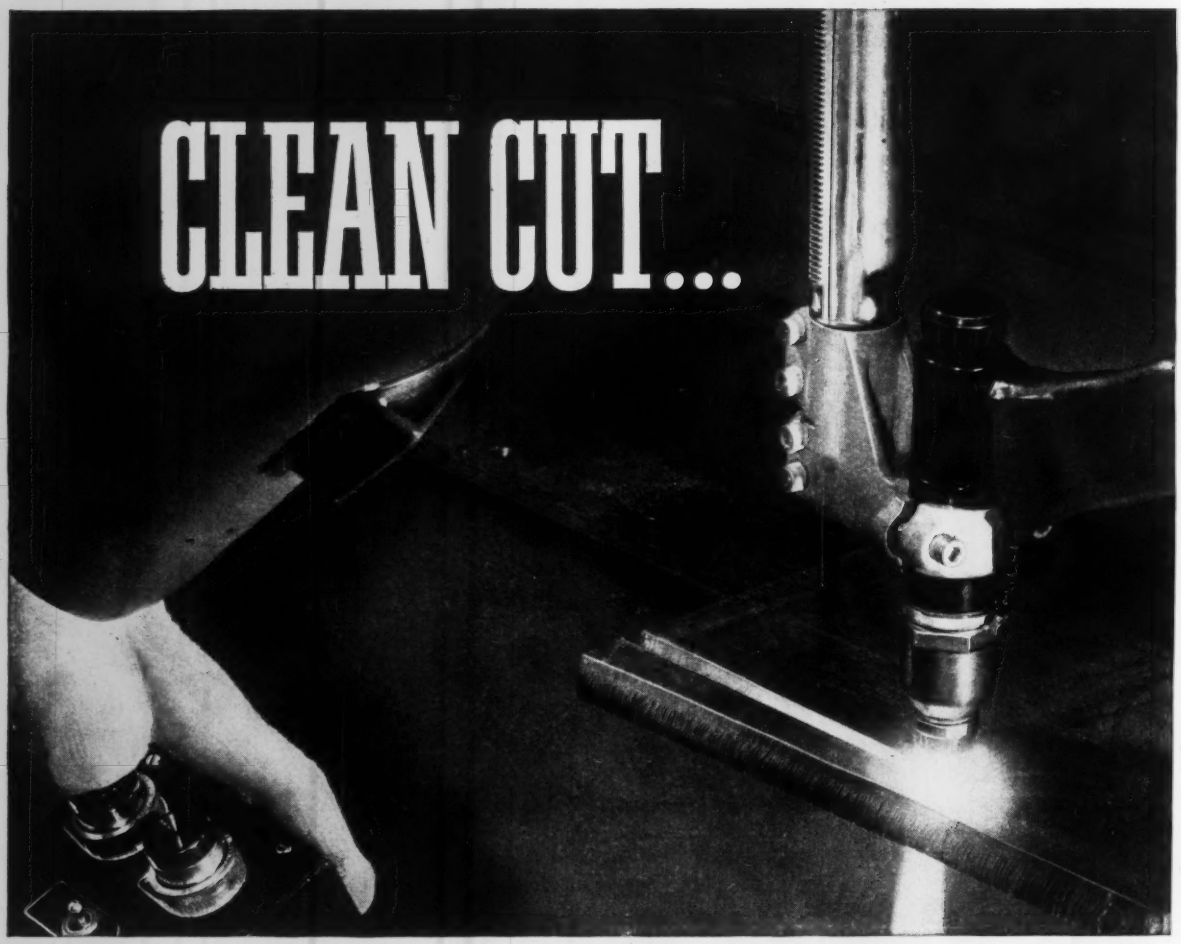
EX-CELL-O CORPORATION *Machinery Division*

DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

58-49



. . . HELIARC Cutting turns hours to minutes

Before: It took 1½ hours to chip an 18-inch hole in an aluminum dome ⅝-inch thick. NOW—The hole is cut in *one minute*—with HELIARC Cutting.

Before: A 54-inch diameter dome hole in ⅝-inch rolled aluminum plate required about 5 hours, with chipping hammers. NOW—Manual HELIARC Cutting does it in about 4½ *minutes.*

HELIARC Cutting employs an extremely high-temperature, high-velocity arc that gives cutting speeds up to 1000 inches per minute on ¼-inch-thick material. It makes saw-like cuts, either square or beveled, in materials up to 3 inches thick . . . *and*, you can take the torch to the work. HELIARC Cutting is equally effective on aluminum, stainless steel, magnesium, copper, carbon steel, or cast iron.

See for yourself—ask your nearest LINDE representative to *prove* that HELIARC Cutting slashes time and labor costs over conventional methods. Call your local LINDE office today! Or write Box ST-105, LINDE COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N.Y. Offices in other principal cities. In Canada: Linde Company, Division of Union Carbide Canada Limited.

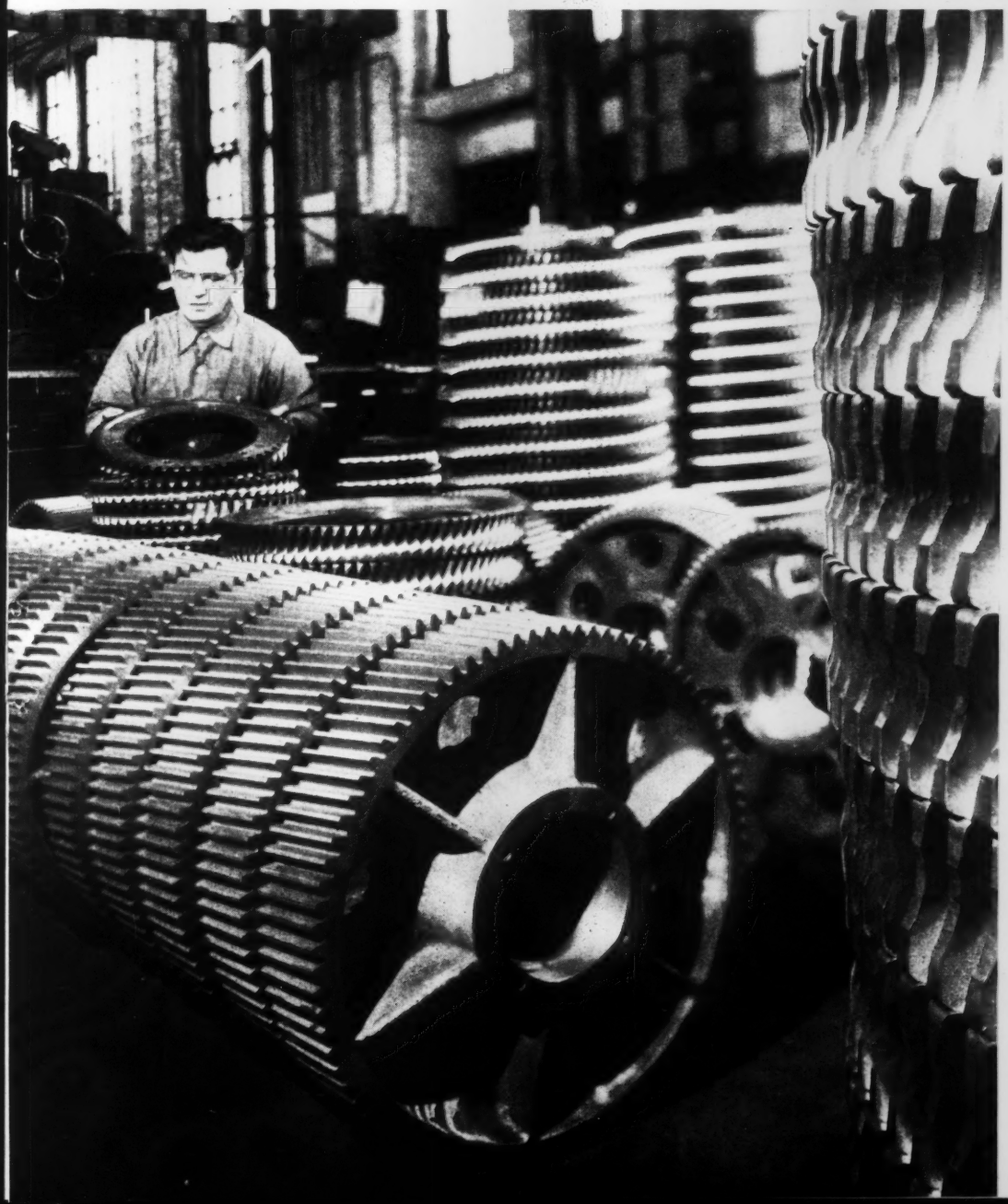
Linde TRADE-MARK

UNION CARBIDE

"Linde", "Heliarc", and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

For truly engineered, truly trouble-free bronzes, specify Federated Silicon Bronzes (50% better ductility, tensile strength up to 65,000 psi); Aluminum Bronzes (heat treated, tensile strength as high as 120,000 psi, with correspondingly high yield strength): and Manganese Bronzes (as-cast tensile strength 125,000 psi, good ductility, high hardness). Federated Engineered Bronzes are the end results of highly perfected production techniques and continuous quality control procedures developed by experienced metallurgists in Asarco's Central Research Laboratory. Ask your Federated field man about Engineered Bronzes and Federated's complete line of quality-controlled copper base casting alloys. Federated Metals Division, 120 Broadway, New York 5. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal.

FEDERATED METALS DIVISION OF



ASARCO

AMERICAN SMELTING AND REFINING COMPANY

Fastener Facts

by Dudley H. Campbell, Director of Engineering —Judson L. Thomson Mfg. Co.

USE OF BIFURCATED (SPLIT) RIVETS

Self-Piercing Fasteners

You specify bifurcated (split) rivets when you want self-piercing, permanent fasteners for high-speed assembly of light metals (up to 0.040" thick), wood, fibre, leather, canvas and plastics.

Slots milled in the bodies of cold-headed solid rivets form two prongs that have the inherent strength of forgings.

Advantages of Use:

With bifurcated rivets, you not only eliminate the delay and cost of pre-punching or pre-drilling holes, but also avoid weakening assemblies through removal of material. Applied by high-speed automatic rivet-setting machines, which can be operated by unskilled help, they reduce assembly time and costs to a minimum.

When you specify Thomson Bifurcated Rivets, you make sure of the fastest possible solution to your fastening problem and earliest possible delivery of test samples and production quantities.

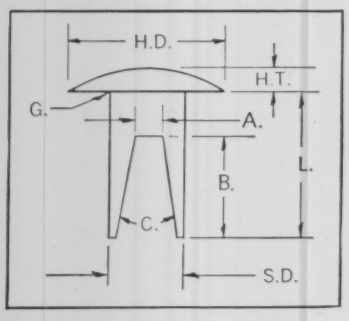
As the first patent holder on bifurcated rivets, Thomson has the longest experience in applying them. Since 1885, thousands of standards have been developed for manufacturers of canvas bags, dog collars and harnesses, golf bags and shoes, hand bags, leather goods, luggage, raincoats, sheet metal products and assemblies, sporting goods, tote boxes, and other products. So your chances of solving special problems with standard bifurcated rivets are best when you call on Thomson.

DIMENSIONAL DATA:

Head Diameter (H.D.) ranges between 1.75 and 2.75 times shank diameter for rivets produced by single-die heading machines. Larger diameters are available at higher cost.

Head Thickness (H.T.) ranges from 0.3 to 0.6 times shank diameter depending on head shape: oval, flat countersunk, ideal, flat, countersunk with bevel on bottom.

Shank Diameter (S.D.) ranges from .040" to .330" for standard sizes.

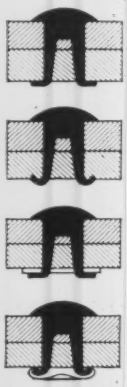


Slot Width (A.), Slot Depth (B.) and **Slot Angle (C.)** vary with each application, depending on thickness and hardness of materials and strength requirements of the clinch. Tests on actual samples are recommended in most cases.

Rivet Length (L.) ranges from 0.6 to 6 times shank diameter. Exact length is generally determined by adding shank diameter to assembly thickness.

Radius (G.) at corners ranges from .005" for ¼" rivets to .015" for 2" rivets.

Four Types of Clinch:



Thomson Bifurcated Rivets are clinched by anvils that spread the prongs flush with the surface, turn their prongs into material, against burrs (washers) or inside caps. The latter two methods are specified when a stronger bearing surface is required. The use of caps improves assembly appearance by giving uniform appearance to both ends of the rivets. Washers and caps are applied by multiple-feed automatic rivet-setting machines. The use of caps, calls for perfectly symmetrical rivets so that neither prong will miss the cap. Thomson guards against such misses by precision manufacturing, statistical quality control, 100% final inspection and factory tests on actual samples.

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Save time and money by asking Thomson Engineers to study your fastening problems before your designs are frozen. This service, performed at your request, promises the speediest delivery of the right rivets and machines for you. Send sketches, prints, or actual samples for recommendations and quotations.

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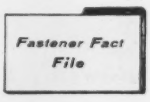
This new Thomson manual is compulsory reading for anybody who specifies or buys fasteners. It covers everything you need to know to take advantage of the economy and speed of rivets and rivet-setting machines: rivet types, applications, material finishes and other vital factors.

Request your copy today. Write Judson L. Thomson Mfg. Co., Dept. S Waltham 54, Massachusetts.



JUDSON L. THOMSON MFG. CO. WALTHAM 54, MASS.

LETTERS TO THE EDITORS

Series for Presidents' Session

The Investment Casting Institute is planning a Presidents' Round Table at its Business and Management Session in New York in November.

Your Management Series would be excellent to provide a base for the presidents' meeting. We believe this series to be the most helpful management aid yet published.

Will you send us copies for the years 1956 to date?

R. R. Miller
President
Investment Casting Institute
Cleveland

STEEL: Asset to Manager

Over the course of years, I have read many articles in STEEL. These, I find, are of a great asset to me in fulfilling my responsibility as manager of operations.

I read with great interest the article, "To Boost Productivity, Consult Your Employees" (Sept. 29, Page 65). I would appreciate ten additional copies.

J. P. Makenas
Manager of Operations
Rheem Mfg. Co.
Chicago

Cloudy Subject Brightens

Since I am aiming to become a marketing manager, I have given considerable study to the meaning of the concept and its interpretation by many companies. I think you have done a good job in presenting a cloudy subject in your article, "Building Marketing Men" (Sept. 22, Page 69), which contains important details and references. It should aid considerably in clarifying this issue for many nonmarketing people who are trying to understand it.

The second paragraph of the article indicates that if you have a co-ordinator-communicator type guy, regardless of where he may be, you should make him your marketing manager. It seems to me this could mislead some people into feel-

(Please turn to Page 12)

Youngstown steel pipe

will help lift structures to the skies in his day

Imposing office buildings of glass and steel, rising to dominate a city's skyline . . . clean, windowless factories encompassing acres in air-conditioned comfort . . . these and the millions of other daring examples of tomorrow's architecture will be built with, and around, more steel piping than we can hardly imagine. Youngstown, today, is anticipating tomorrow's need for more and better steel pipe—whether for fluid transmission or structural purposes. Advancements in metallurgy and steelmaking facilities will make certain that when expanding needs of the future call for better steel pipe... *Youngstown can supply it.*

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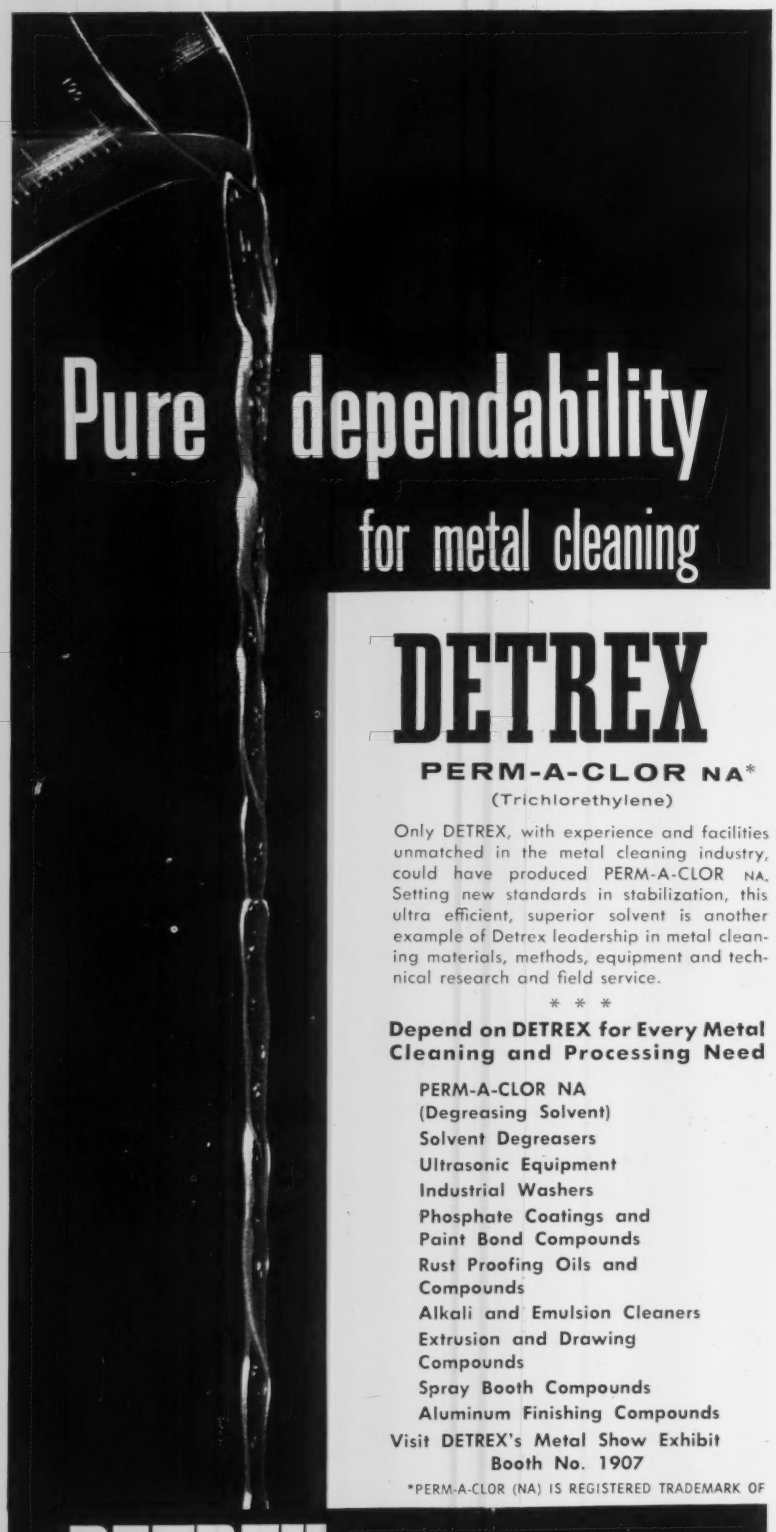
SHEET AND TUBE COMPANY
Youngstown, Ohio

Manufacturers of Carbon, Alloy and Yoloy Steel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LETTERS

(Concluded from Page 10)

ing the problem is less difficult than it really is. You do clarify the issue to some extent later by quoting a *Printers' Ink* study on the source of managers. You will note if you look at this that the bulk of the people succeeding in these functions come from customer-oriented functions like sales and market research.

As a marketing man, however, I appreciate articles of this caliber since there is a tremendous need for clarification and education with regard to this marketing manager concept. Congratulations on an excellent job!

Thomas C. Young
Manager
Commercial Research
Lukens Steel Co.
Coatesville, Pa.

• *It's true that market managers are usually found in customer-oriented functions. The article sought to make this additional point: Look beyond titles and functions in your search for a market manager. It's possible, for example, that your controller may be better qualified than your sales manager. The final decision depends upon the man, not his title.*

Quality Plan for Production

I have just read with great interest your article, "Here's a Simple Quality Plan" (Oct. 6, Page 88), and I would like to present it to our production department.

Will you send us additional copies?

J. W. Wursthorn
President
Cleveland Hydraulic Co.
Cleveland

• • •

Will you please send me a reprint of this interesting article?

Ernest Erwin
Director of Quality Control
Lockheed Aircraft Corp.
Georgia Div.
Marietta, Ga.

Stimulating, Valuable Article

Your article, "Purchasing for Profit" (Oct. 13, Page 89) is both stimulating and valuable.

May I please have reprints for distribution to our management?

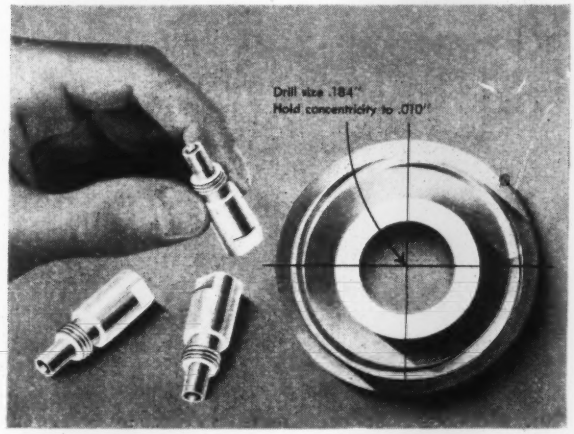
William J. Allen
Purchasing Agent
Magnetics Inc.
Butler, Pa.

• • •

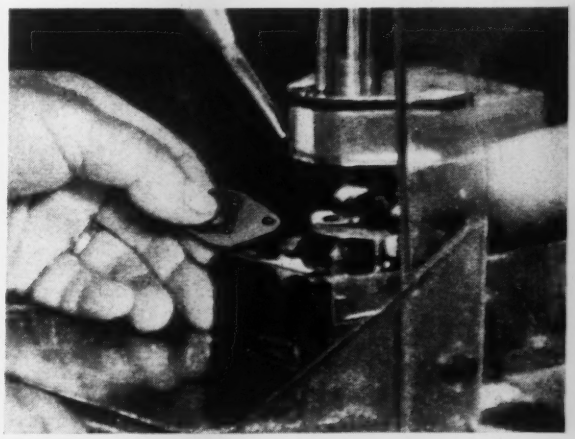
Your article is of considerable interest to us. Will you please arrange to forward four copies to me?

A. A. Marsh
Manager, Marine Purchases & Supply
Marine Div.
Mackay Radio & Telegraph Co. Inc.
Clark, N. J.

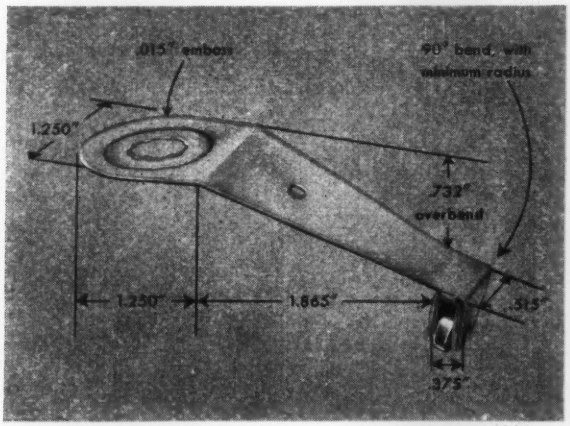
THE RIGHT METAL often costs less, may give you surprising savings in fabricating time and cost. Talk to the Man from Anaconda about matching metals to your specific needs, today.



BRASS ROD WITH A SLIGHTLY HARDER CORE than standard rod eliminated rejects (that had run up to 15%) for M. J. Grass Screw Machine Products Co., Buffalo. With standard rod, in drilling a deep hole on multiple spindle machines, the drill tended to wander past the concentricity tolerance.

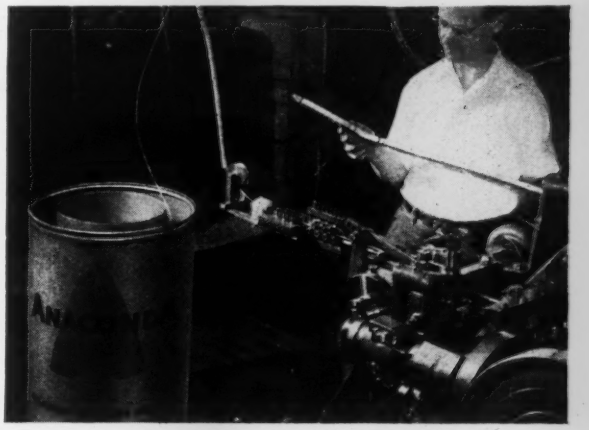


LEADED COPPER STRIP (machinability rating 80%; conductivity, 99% IACS) boosted production, cut over-all costs 25% for Truelove & Maclean, Waterbury, Conn., in making power transistor bases. Adequate production with ordinary electrolytic copper would have called for new equipment investment.



SUPERFINE-GRAIN PHOSPHOR BRONZE eliminated fractures in forming complex variable voltage tap springs (above) used in Lionel's Trainmaster transformers. Lionel had considered substituting a costlier alloy but Duraflex* did the job at no extra cost.

*Anaconda superfine-grain phosphor bronze



PAY-OFF BARRELS with big coils of brass wire cut down-time 90% at wire forming machines for West Haven (Conn.) Buckle Co. Machines making surgical buckles had used light coils for free pay-off; new coils had to be fed in about every hour.

From a base of 93 standard alloys, The American Brass Company can provide an almost unlimited number of combinations of useful properties. It may take only a minor variation in fabrication or annealing in your present alloy to make the metal fit your need exactly. Or you may need another alloy—perhaps one that is less familiar to you because it has had such highly specialized application. So when new or unusual problems arise, ask for the help of our Technical Department. See your Anaconda representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

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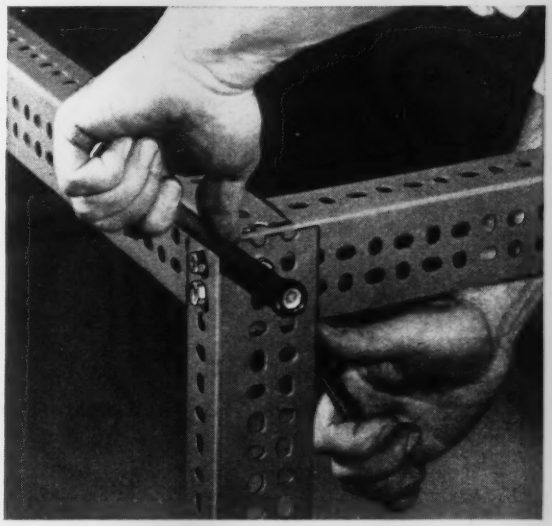
Republic Steel Lockers stand up under toughest conditions of "he-man" service. Made of cold-rolled heavy-duty steel, Republic Lockers offer many advantages in durability, efficiency, convenience, protection.

Republic Steel Lockers are Bonderized. This Republic feature provides a superior base for the baked enamel finish . . . protects against rust and corrosion . . . restricts damage due to bumps, scratches, and abrasion of every day service to the site of the injury . . . reduces maintenance costs to a minimum . . . helps build employee morale.

Plan your new or expanded dress-wash-and-change facilities around Republic Steel Lockers. Republic's Berger Division knows how to build the locker quality you need at a competitive price. Call your Republic-Berger representative, or send coupon for facts.



REPUBLIC METAL LUMBER® is a new idea for making special purpose tables, stands, catwalks, racks, scaffolds. It's Republic's Berger Division's new slotted construction angle. Simply plan your assembly, cut METAL LUMBER, join with bolts. Horizontal and vertical slots make adjustment easy. Bonderized and finished with gray baked enamel after fabrication. Shipped in convenient bundles of 10 angles, 10- or 12-foot lengths. Stores in same space as one 2" x 4" piece of lumber. Write for catalog.

REPUBLIC'S "KNOW-HOW" SOLVES FABRICATION PROBLEM. Continental Can Company, Chicago, wanted a specially constructed "torture" chamber of rack-type shelving with sliding shelves to accommodate a variety of can sizes and types to weather severe changes in temperature. Republic's Berger Division solved the problem through its contract manufacturing facilities and equipment. In Berger plants many sheet steel products are fabricated for other customers and marketed under the manufacturer's brand name. Republic's fabricating "know-how" provides you with the same high quality you see in Berger Division products—lockers, office furniture, shelving, and steel kitchens. Send a sketch or blueprint with complete specifications. Berger will tell you promptly what their specialized services can do for you.

REPUBLIC MATERIALS HANDLING SPECIALISTS engineered these steel boxes to the exact requirements of the Kropp Forge Company, Chicago, Illinois. Special features include corrugated construction for extra strength, a smooth channel around the top to eliminate dangerous sharp edges, four-way fork channels to simplify handling, and stacking brackets welded to top corners to permit tiering to any practical height. As a result, these boxes save time, space, and money in handling and shipping operations. New materials handling ideas from Republic may help you gain similar advantages. Send coupon for facts.

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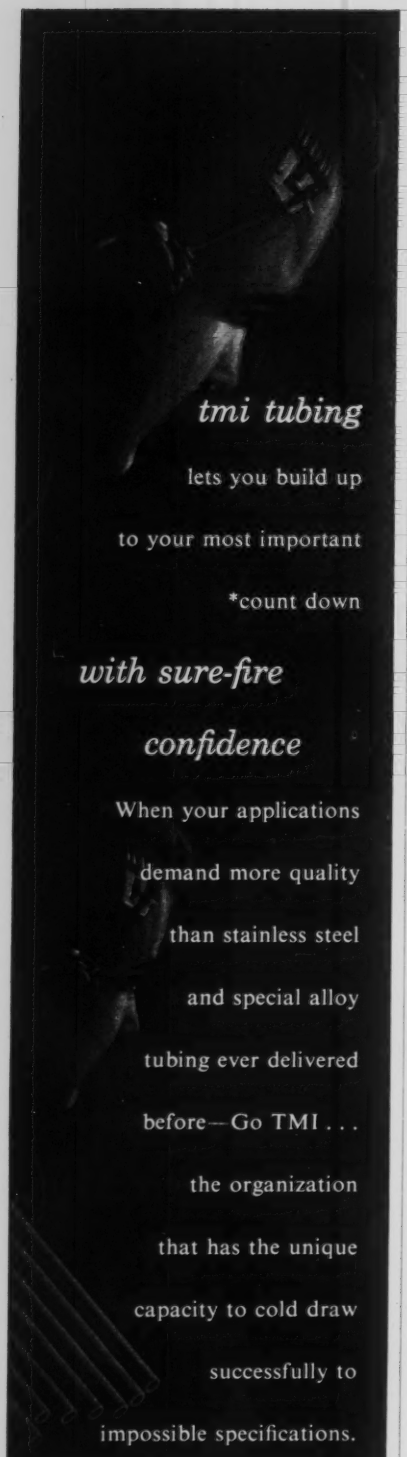

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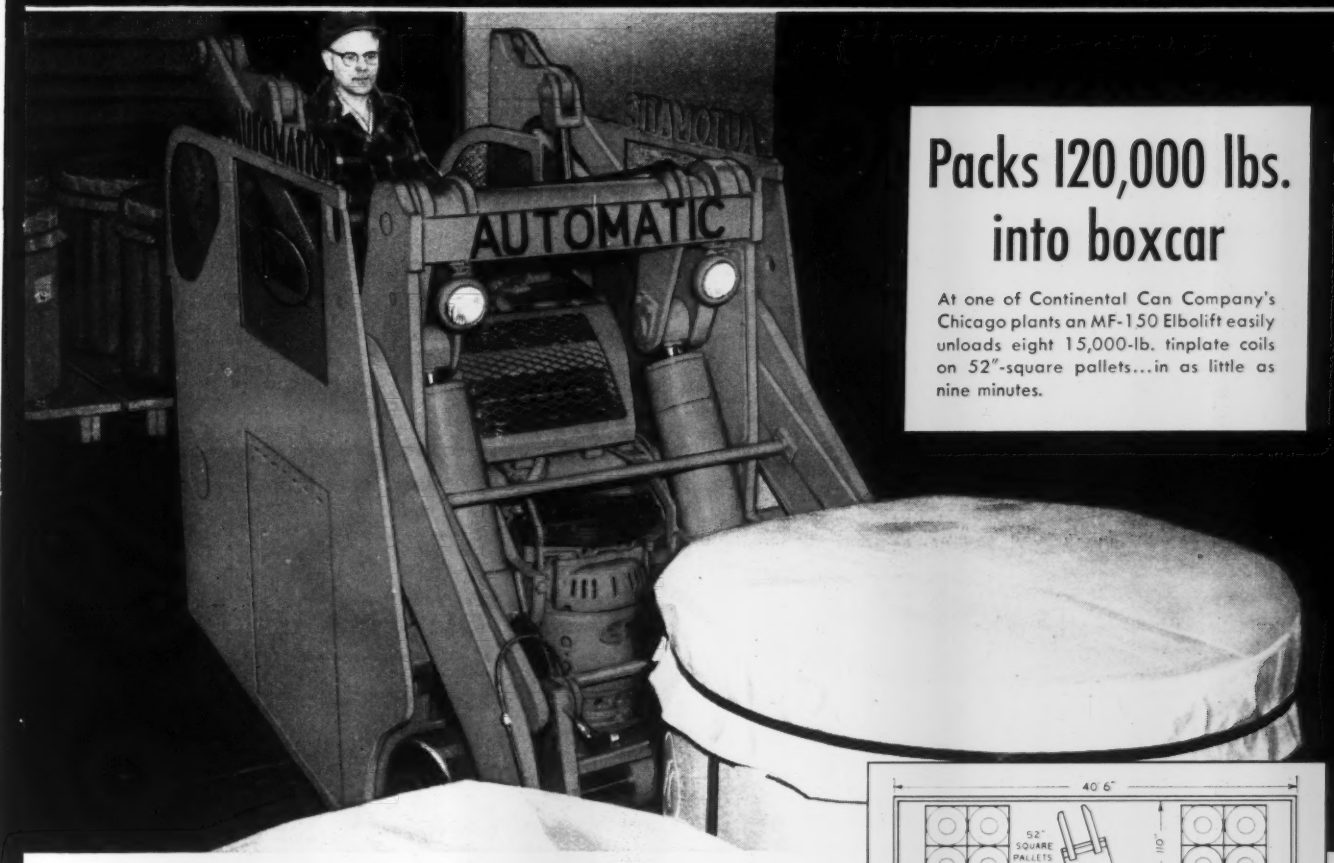
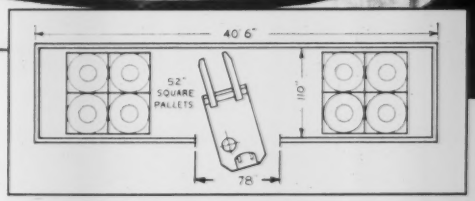


Packs 120,000 lbs. into boxcar

At one of Continental Can Company's Chicago plants an MF-150 Elbolift easily unloads eight 15,000-lb. tinplate coils on 52"-square pallets...in as little as nine minutes.



Automatic Elbolift does more work... handles heavier loads in less space.

High Stacking in Tight Quarters—Note operator's wide field of vision for stacking while maneuvering in a 53"-wide aisle. End gate optional equipment.

Automatic Elbolift's radical departure in design from the conventional mast-type truck has achieved these superior qualities for working in confined areas:

Compact Design....Elbolift with its stand-up end control design can operate easily through a 78" boxcar door with a 52"-square load.

Increased Visibility....Makes maneuvering in tight areas a snap.

Reduces Weight....Lowers floor loading requirements: for example, a 15,000-lb. capacity Elbolift weighs up to 6,000 lbs. less than a comparable mast-type truck.

New Inching Control....4 speeds forward and reverse with foot inching to any speed pre-set or selected by control handle.

Improved Load Distribution....Since tires take up ⅔ of Elbolift's 48" overall width... 32 lineal inches of tire contact with floor provides better distribution of load.

High Stacking....Built-in retraction feature maintains maximum stability every inch of its 120" lift.

But there are many more advantages, all fully described and illustrated in an informative brochure that is yours for the asking. No obligation; just mail the coupon. Ask about Automatic's convenient lease and purchase terms.

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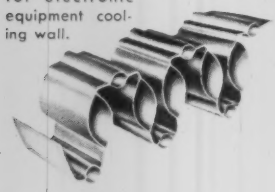
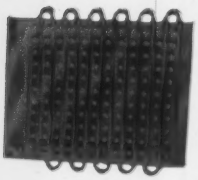
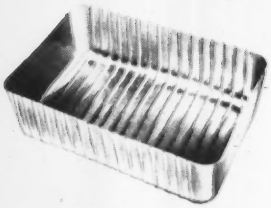


Section of Aluminum Tube-In-Strip combining refrigerant passages with air cooling for electronic equipment cooling wall.

Copper Tube-In-Strip used as a combustion chamber for water heater.



Copper Tube-In-Strip with return bends attached to produce a cooling plate.



This electronic cooling case of Revere Aluminum Tube-In-Strip was inflated after drawing.

REVERE *Tube-In-Strip* SCORES

NOW USED AS WATER-COOLED BUS BAR in manufacture of General Electric Semiconductor Rectifiers

HAS THESE 4 BIG MONEY-SAVING ADVANTAGES

1 Because it is a homogeneous mass Revere Tube-In-Strip eliminates the possibility of leaks.

2 User is able to obtain more efficient cooling.

3 If user finds it necessary to change cells it can be done without draining the system.

4 Revere Tube-In-Strip enables user to have a completely sealed system, thus eliminating O-rings or gaskets.

The use, by General Electric, of Revere Tube-In-Strip as water-cooled bus bar is still another of the myriads of ways this revolutionary product can be applied in industry.

The unique thing about Revere Tube-In-Strip is that it is a solid piece of metal, not two strips welded, brazed or bonded together. You buy strip, fabricate it as you wish, stamping, bending or forming it, and then as a final operation inflation expands the integral channels into tubes. Expanding in the open, the tubes are round; by expanding into dies, the tubes can be made rectangular, fluted, half-round, hexagonal, etc.

Revere Tube-In-Strip saves on first cost, and in fabrication. New and improved designs are made possible. The web between the tubes conducts heat faster. The vastly increased structural strength means you can use lighter gauges, saving in weight and price.

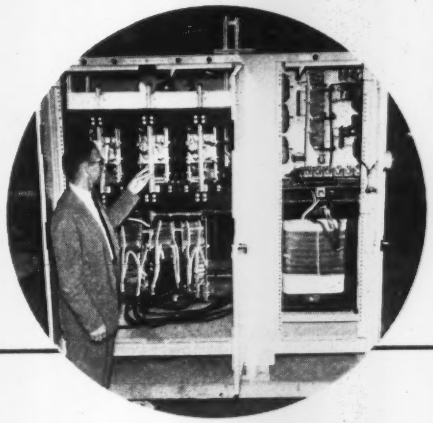
Revere Tube-In-Strip is available in Copper, Copper-base alloys and Aluminum alloys. The Revere Technical Advisory Service and the Research and Development Department will gladly collaborate with you in taking full advantage of this marvelous new material.

REVERE COPPER AND BRASS INCORPORATED

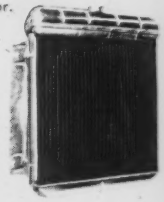
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

Mills: Rome, N. Y.; Baltimore, Md.; Chicago, Clinton and Joliet, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities, Distributors Everywhere.

Copper Tube-In-Strip spiral containing both water and refrigerant passages for increased cooling efficiency.



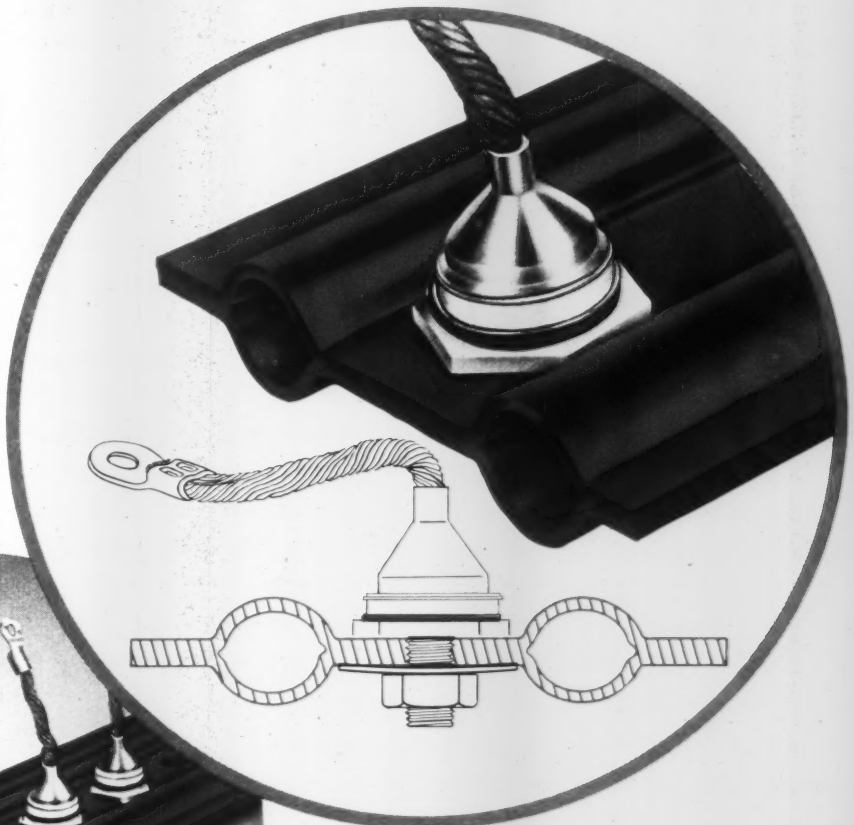
Copper Tube-In-Strip and copper fin assembly for automobile radiator.

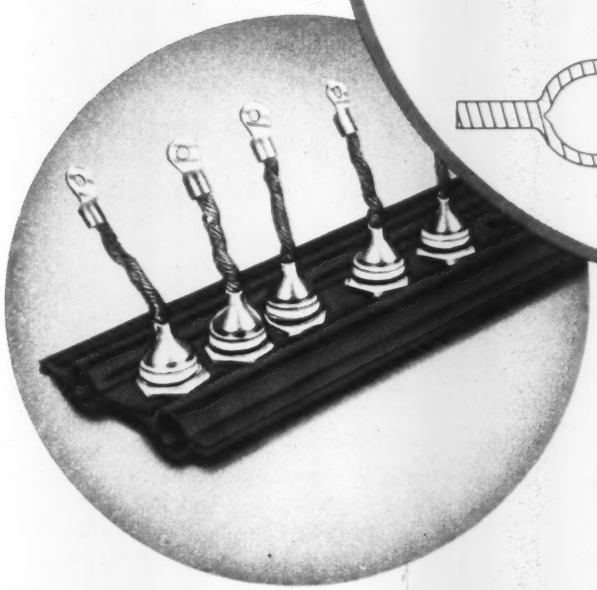


Copper Tube-In-Strip and finned stock assembled and then inflated into automotive air conditioning coil.

ANOTHER TRIUMPH!

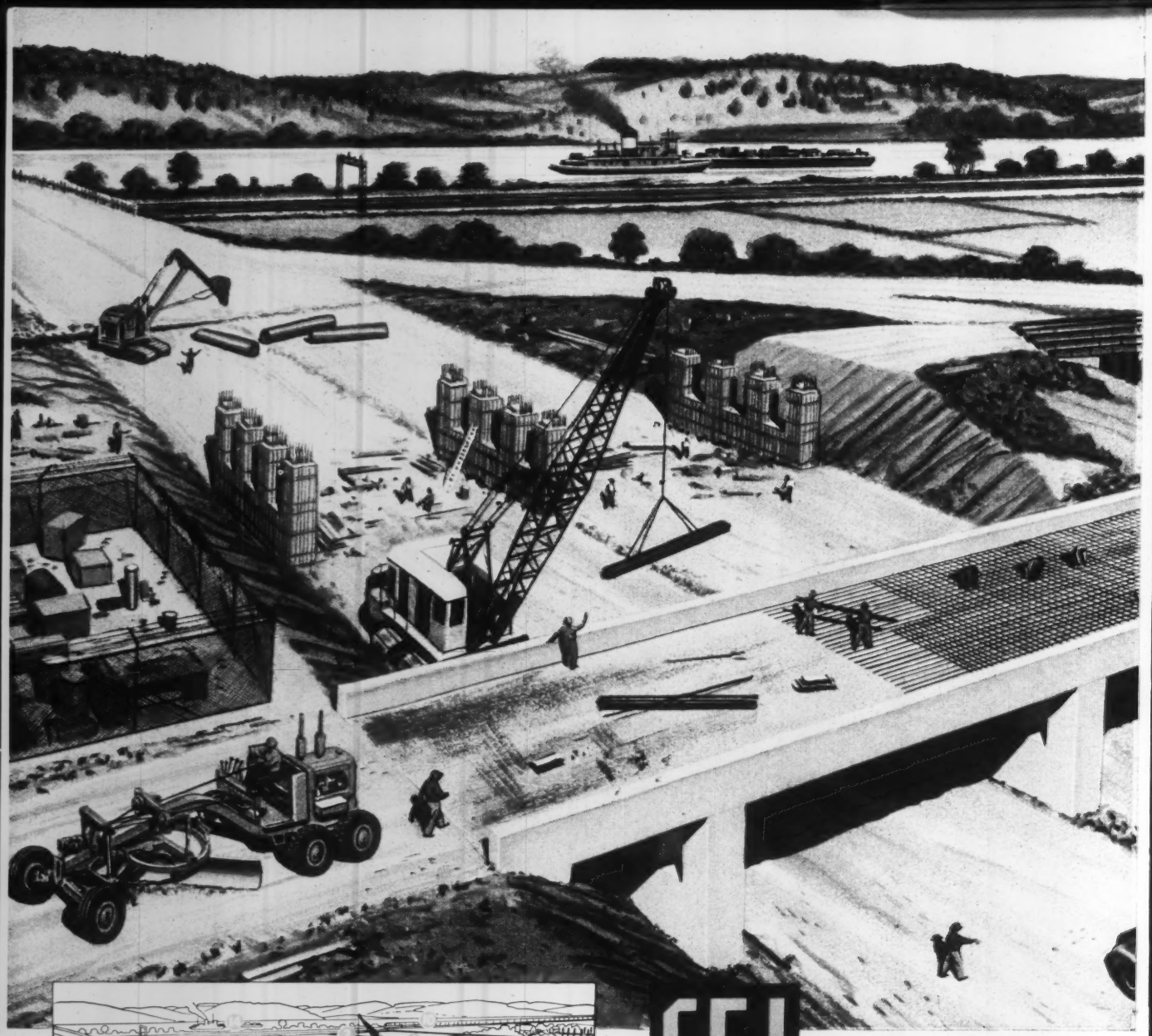
PHOTO IN CIRCLE ABOVE SHOWS water-cooled semiconductor power rectifier design with integrally mounted transformer as made by General Electric Company. Rated 150 volts, 4000 amps., d-c, it is used for copper refining.

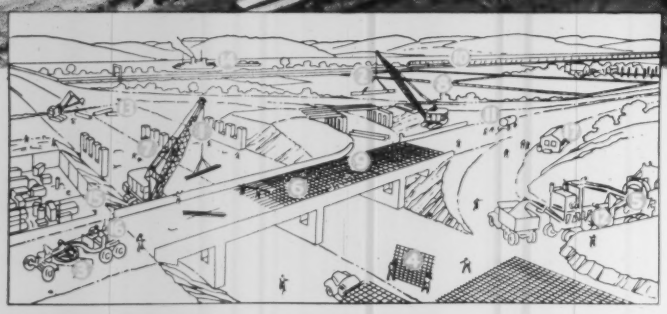




(*Above*) **CROSS SECTION** of water-cooled bus, featuring improved cooling method. Dual, leak-proof water passages are formed in solid bus, made from Revere Tube-In-Strip, without the need for welding or brazing. They are located on each side of a section of bus to which silicon cells can be bolted without penetrating the coolant passages.

(*Left*) **OVERALL VIEW** of new sealed liquid-cooled bus illustrating manner of mounting several silicon rectifier cells. Unique "dry" mounting permits installation of cells without draining liquid from bus. Cells are individually attached to the bus with threaded stud and nut, simplifying the mounting of a cell, and making it unnecessary to disturb any of the other cells on the bus.





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2. Wickwire Wire Rope Slings
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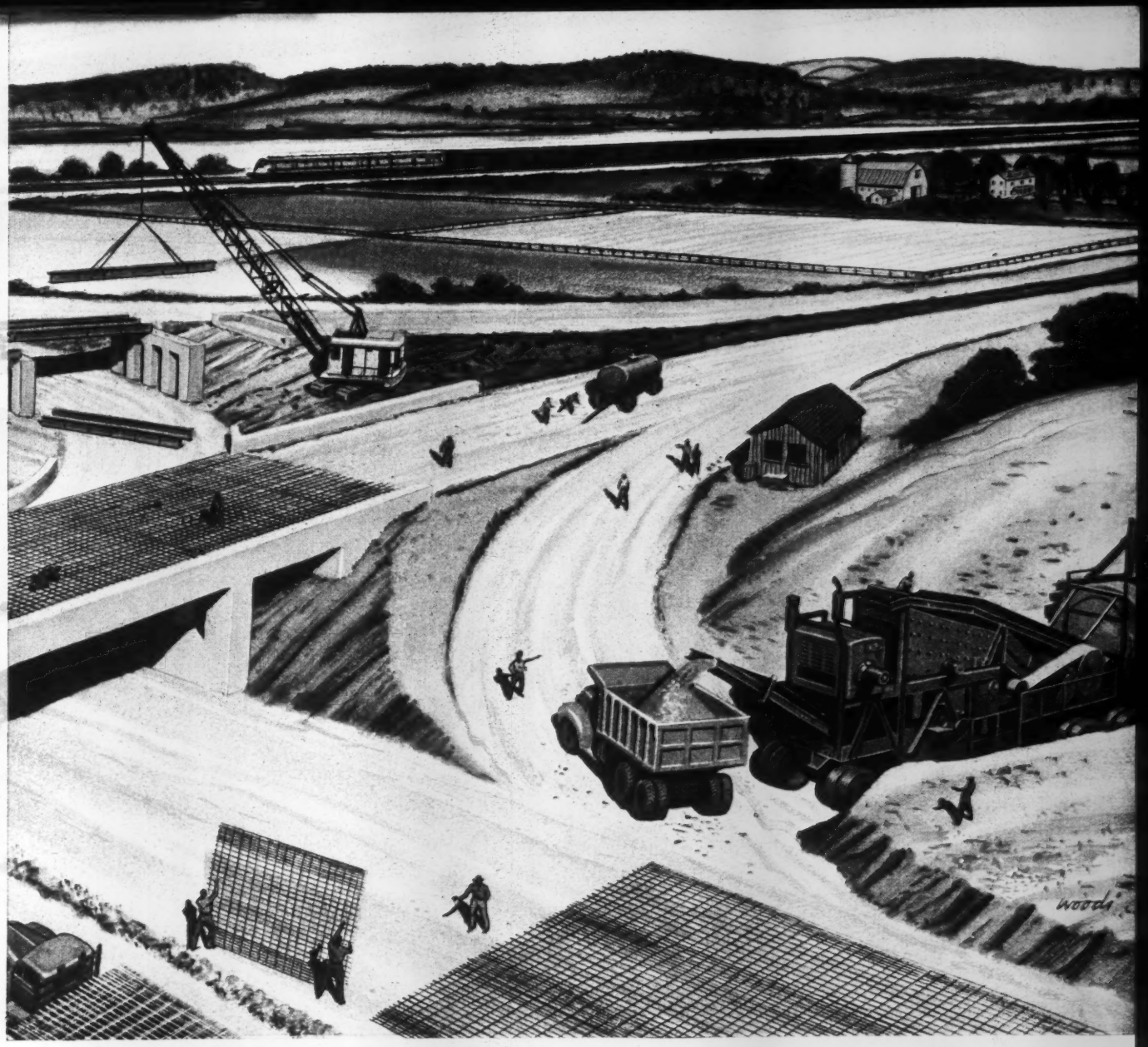
5. CF&I Industrial Screens
6. CF&I Reinforcing Bars
7. CF&I Nails and Spikes
8. CF&I Woven Wire Fence & Fence Posts
9. Cal-Tie Wire
10. CF&I Rails, Spikes, Track Bolts and Tie Plates
11. Claymont Heads
12. Claymont Fabricated Steel Parts
13. Claymont Large Diameter Pipe
14. Claymont Alloy Steel Plates
15. Realock Chain Link Fence
16. Wickwire Springs
17. Gold Strand Insect Wire Screening



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All over America, efficient road contractors are building a vast network of roads . . . roads which will swiftly and safely carry billions of cars and trucks in the years ahead.

Their's is a difficult task . . . especially since economy must play such an essential part in each project. That's why you'll see so many CF&I Steel Products on jobs like this throughout the nation —for they perform both difficult and routine jobs swiftly, safely and economically.

Like road builders, it'll pay you to get the full story on how CF&I Steel Products help you on *your* job. See your nearby CF&I representative today.

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WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo • Chicago • Detroit • New Orleans • New York • Philadelphia

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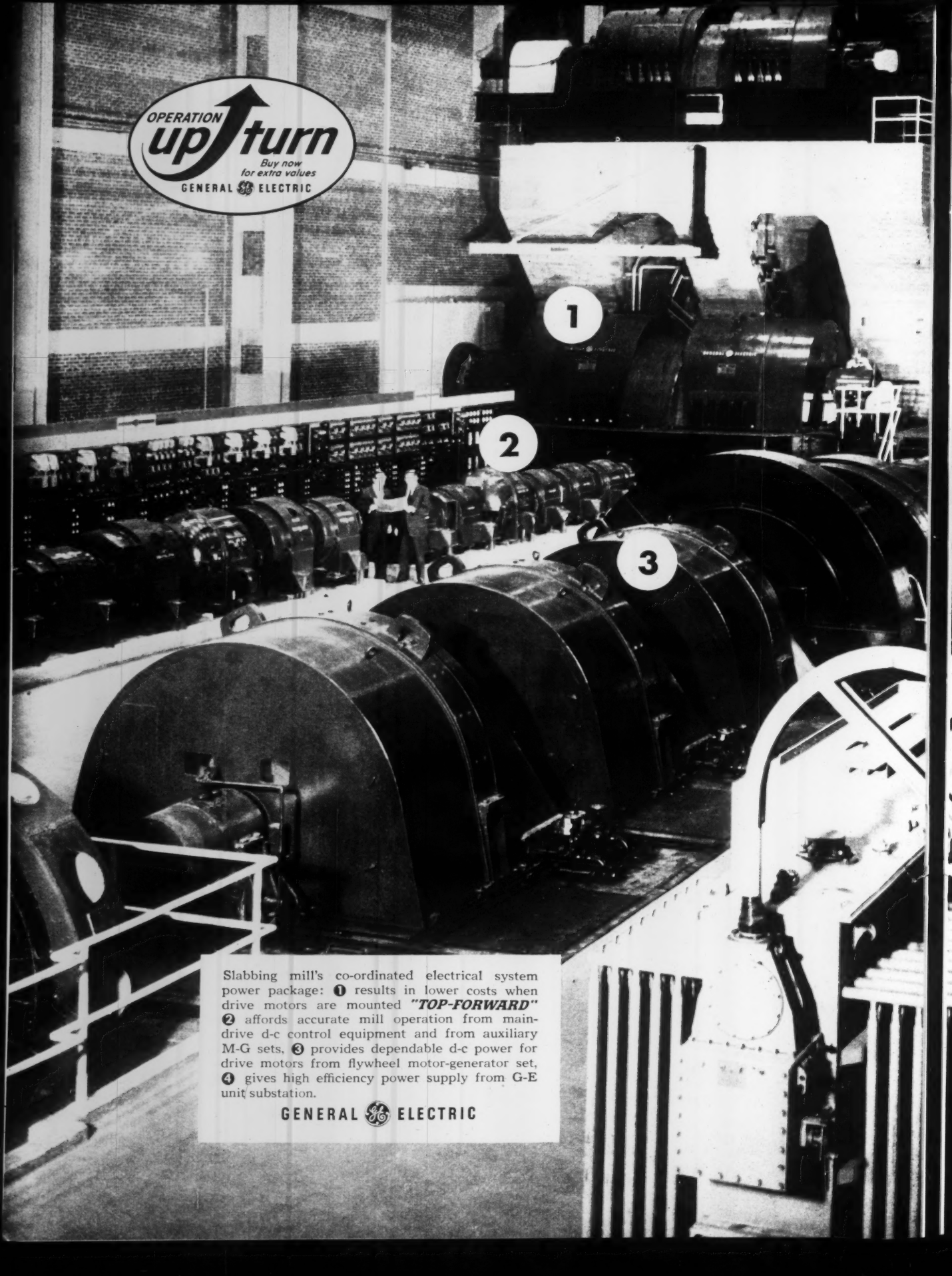
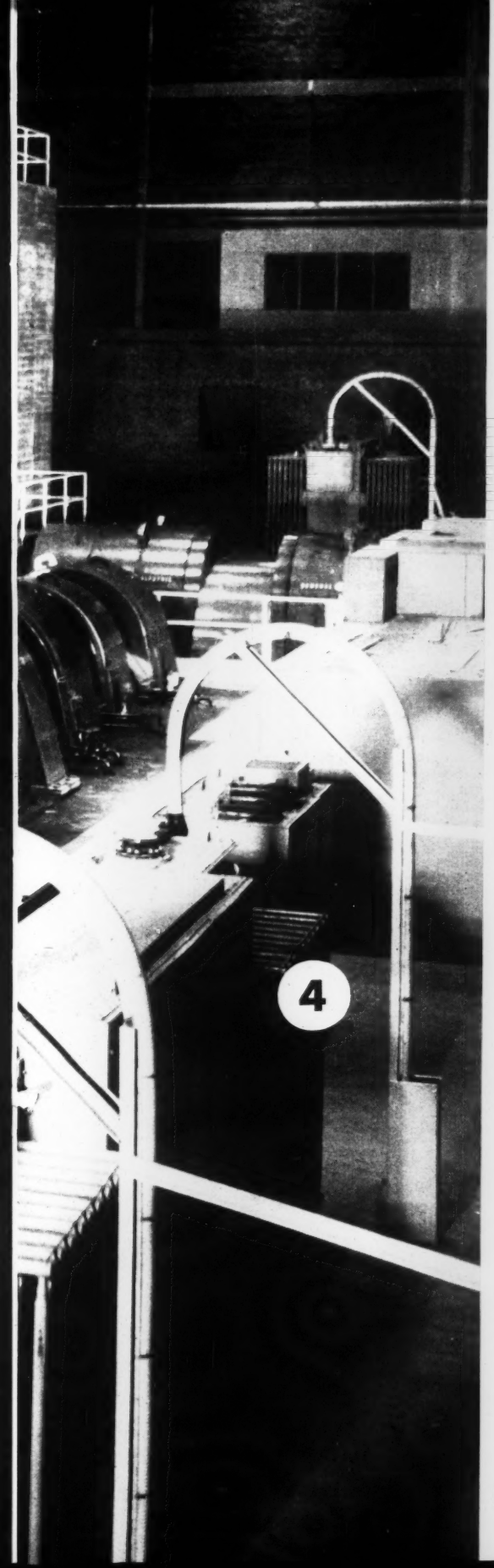


Slabbing mill's co-ordinated electrical system power package: ❶ results in lower costs when drive motors are mounted ***"TOP-FORWARD"*** ❷ affords accurate mill operation from main-drive d-c control equipment and from auxiliary M-G sets, ❸ provides dependable d-c power for drive motors from flywheel motor-generator set, ❹ gives high efficiency power supply from G-E unit substation.

GENERAL ELECTRIC



New General Electric Drive System . . .

Lowers Installation, Maintenance Costs

A new General Electric DC Drive System for reversing mills incorporates unique features designed to save considerable installation and yearly maintenance expense. With the G-E design, large twin drive motors become easily accessible—this means less maintenance expense. And, with ventilating equipment "built-in", foundation and other installation costs are reduced. Modernization of obsolete mills becomes more economical than ever before.

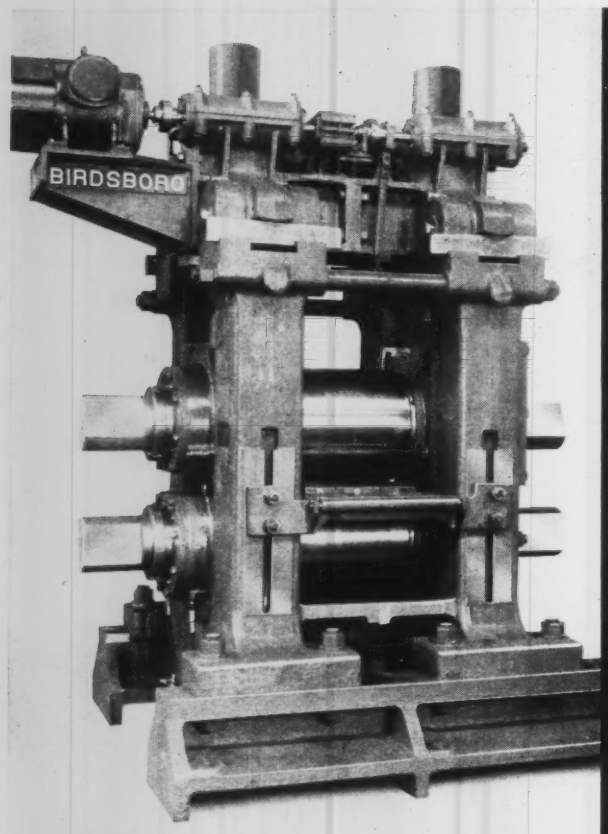
Now in operation at an Eastern mill, the new drive system resulted from an extensive G-E engineering study into previous construction and maintenance procedures. The new ***"TOP-FORWARD"*** arrangement, for example, places the top motor nearest the mill, with the rear motor shaft passing under the forward motor. Result: servicing time is reduced. Design of quick-removable motor covers permits faster servicing, with a minimum of effort.

These revolutionary ***"TOP-FORWARD"*** mill motors with extra value features available now, combine with other electrical system components to give one of the fastest and most accurate drive systems now available to the metal rolling industry.

G.E. is ready to work with you to provide the most advanced quality-engineered electrical equipment for your mill applications. Your nearest General Electric Apparatus Sales Office will give you complete information. Write for GEA-6812, DC Drives for Metal Rolling to General Electric Company, Schenectady 5, N. Y. 659-122

Engineered Electrical Systems for Steel Mills

GENERAL ELECTRIC



Birdsboro 22" 2-High Reversing Mill for Rolling Nuclear Metals

BIRDSBORO

engineering helps industry solve problems in rolling new 20th Century metals

• Important advances are being made in the processing and fabrication of new alloys. Many of these developments have been made in cooperation with Birdsboro engineers and incorporated in Birdsboro mills. Take this opportunity now to learn more about what is being done, and what can be done in the rolling of 20th Century Metals. Contact: *Main Office, Engineering Department and Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

MM-64-58

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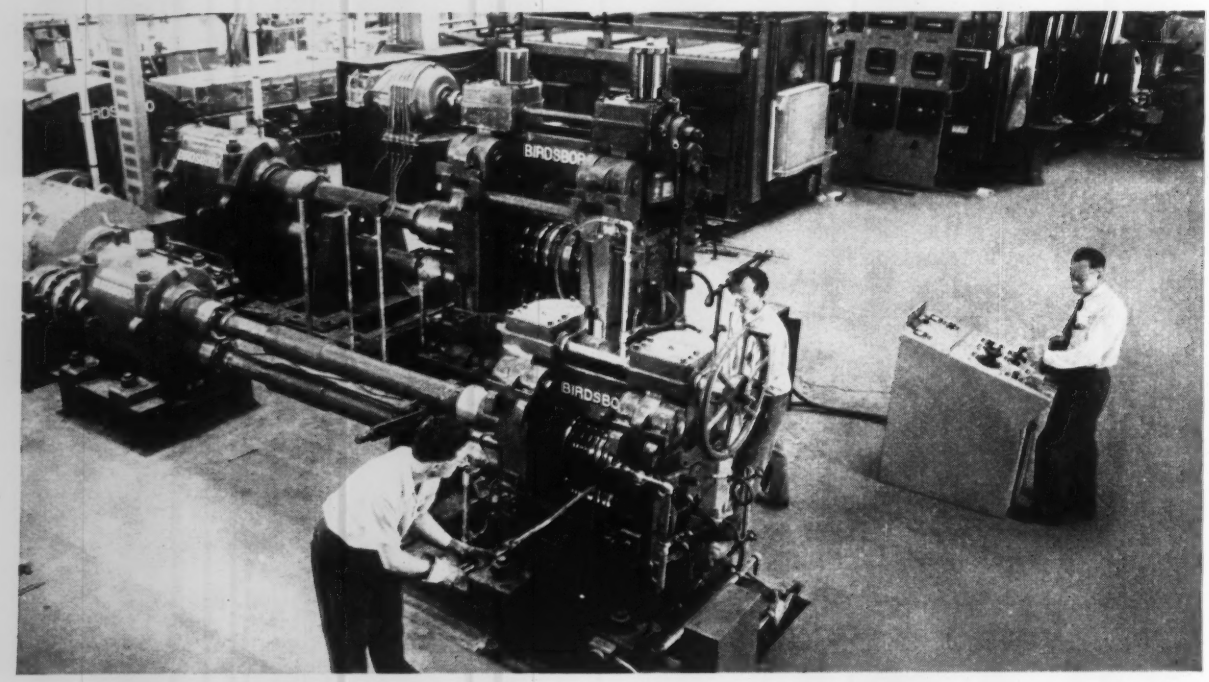
STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

Birdsboro 16"-10" Bar Mill with Combination Drive for Rolling New Alloys



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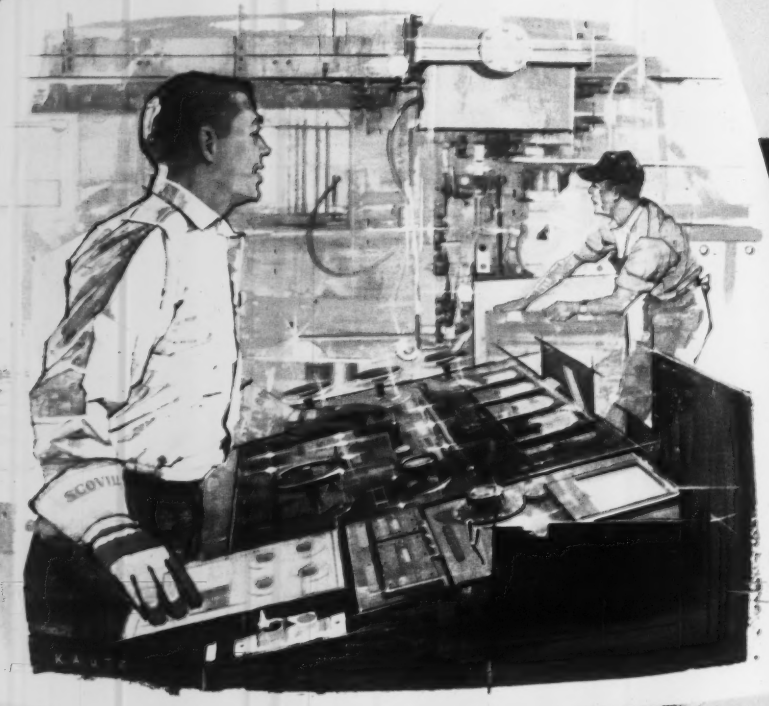
made better to bring out the BEST in your products

your product quality



is safeguarded here

"Ninety-nine times out of a hundred, fabricators who pride themselves on smooth-running and profitable operations give a large share of the credit to the mill products they use.

"For example, every working day we roll miles of strip through this mill. Any significant variation of any kind in the metal would eventually show up as a variation in performance on the fabricator's production line.

"That's why at Scovill every experienced worker, every ultra-modern machine and method, is dedicated to maintaining an exceptional standard of uniformity in our Mill Products... to safeguard quality on your production line...to bring out the BEST in your products."

Howard R. Kraft, Rolling Mill Superintendent

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Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn. Phone Plaza 4-1171.

CALENDAR
OF MEETINGS

Oct. 27-29, American Gear Manufacturers Association: Semiannual meeting, Edgewater Beach Hotel, Chicago. Association's address: 1 Thomas Circle, Washington 5, D. C. Executive director: J. C. Sears.

Oct. 27-29, National Lubricating Grease Institute: Annual meeting, Edgewater Beach Hotel, Chicago. Institute's address: 4638 J. C. Nichols Parkway, Kansas City 12, Mo. Executive secretary: T. W. H. Miller.

Oct. 27-31, American Institute of Electrical Engineers: Fall general meeting, Pittsburgh. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Oct. 27-31, American Society for Metals: Annual meeting, Statler Hotel, Cleveland. Society's address: 7301 Euclid Ave., Cleveland 3, Ohio.

Oct. 27-31, Metallurgical Society of AIME: Institute of Metals Division's fall meeting, Carter Hotel, Cleveland. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: Ernest Kirkendall.

Oct. 27-31, National Metal Congress & Exposition: Public Auditorium, Cleveland. Sponsor: American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Oct. 28, Ultrasonic Manufacturers Association: Annual meeting, Hotel Cleveland, Cleveland. Association's address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

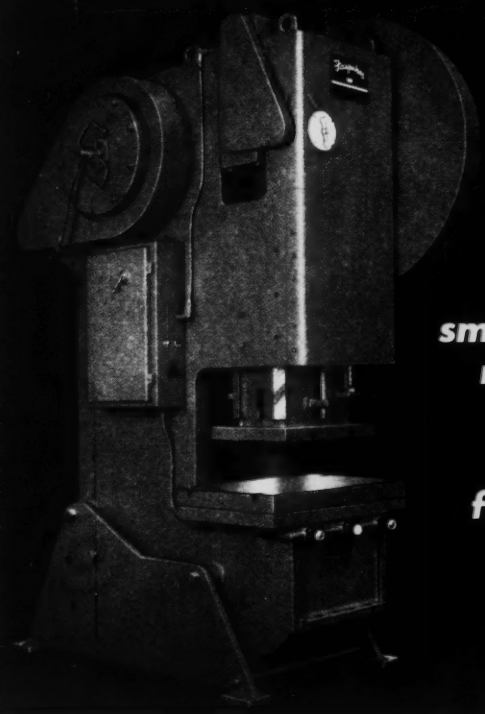
Oct. 30-31, Society for Advancement of Management: Conference on progress in management for profit and growth, Hotel Statler-Hilton, New York. Society's address: 74 Fifth Ave., New York 11, N. Y. Executive vice president: Harold R. Bixler.

Oct. 30-Nov. 1, Metal Treating Institute: Annual meeting, Hotel Cleveland, Cleveland. Institute's address: 271 North Ave., New Rochelle, N. Y. Executive secretary: C. E. Herington.

Nov. 3-5, National Fluid Power Association: Fall meeting, Drake Hotel, Chicago. Association's address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

Nov. 5-6, Society of Automotive Engineers: National fuels and lubricants meeting, Mayo Hotel, Tulsa, Okla. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

This new OLIVER-FARQUHAR
O.B.I. Mechanical Gap Press



whisper quiet...

smooth running...

fast setting...

for dependable high production

You'll want new Oliver-Farquhar O.B.I. Mechanical Gap Presses for blanking, forming, drawing, bending and assembling operations. Designed and built into these O-F presses are features such as these . . .

- Rigid welded rolled steel frame with side members of uniform thickness.
- Box type slide construction with long gibs and gibways—constant, dependable alignment.
- Pneumatic counterbalance cylinders—slides and dies "float" to reduce shock.
- Continuously rotating low inertia type clutch—higher cycling, cooler operation, low maintenance.
- Adjusting screw fully-guided, large-diameter, long-barrel type—easy adjustment at floor level.
- Built to J. I. C. (Joint Industry Conference) Standards—for in-service uniformity.
- Available in four models—75, 110, 150 and 200-Ton capacities.

Write, wire or phone for complete details on the new, heavy-duty, Oliver-Farquhar O.B.I. Mechanical Gap Presses now available for delivery.

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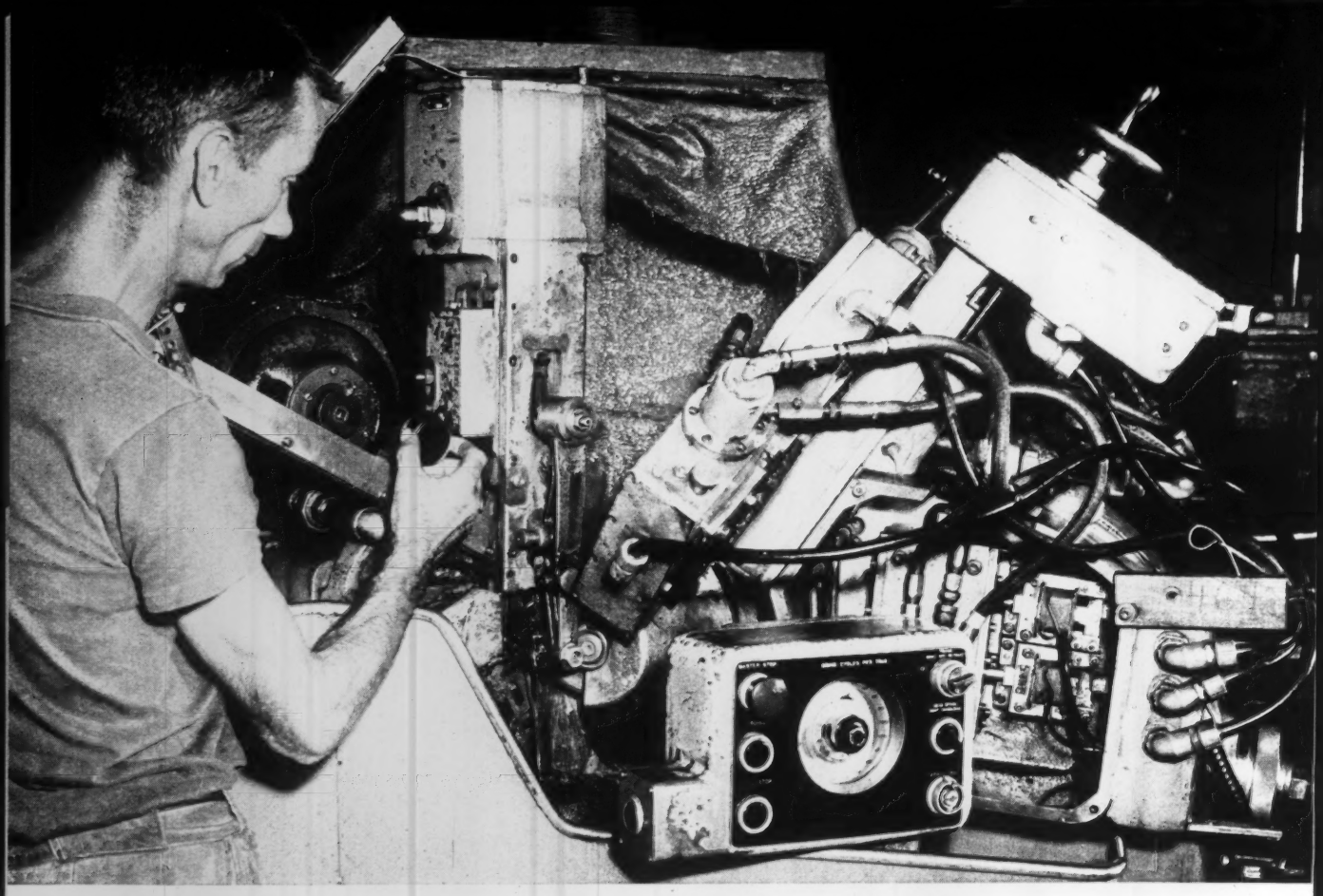


bearing life boosted from

THREE WEEKS TO FOUR YEARS

with Texaco Cleartex Oil

Tyson Bearing Corp., Division of SKF Industries, Massillon, Ohio, extended the life of micro-centric grinder bronze sleeve bearings from 3 weeks to 4 years (and they're still going strong) using *one* oil—Texaco Cleartex B—for both grinding *and* machine lubrication.

Before Cleartex was used, machine bearings would fail in about 3 weeks, because the lubricant became contaminated by grinding oil. With Cleartex this problem simply doesn't exist. A premium quality lubricant, Cleartex is *also* a fine grinding oil. In fact, Tyson now gets as many as 20 pieces per wheel dressing, each with a better finish, compared to the 10 or 12 that were previously obtained.

You can do any machining work better, faster and at lower cost with Texaco—a complete line of cutting, grinding and soluble oils. A Texaco Lubrication Engineer will gladly help you select the right ones for your job. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write: The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Metalworking Outlook

Auto Buyers Must Wait

The 1959 autos will be slow to reach the nation's roads because of local strikes. But car marketers in Detroit aren't unduly alarmed. "The wait should whet the public's appetite," believes one. An effect of the delay is to prolong the guessing about the impact of 1959 model sales on the general economy. Our estimate: The showing will be fine—5.5 million cars—which means good sales for the many of you in metalworking who supply automotive manufacturers.

Ultrasonic Sales Will More Than Triple

Gross annual sales of ultrasonic equipment for nonmilitary use, now less than $40 million, will reach $150 million within five years. The 25 to 50 per cent annual increase will result primarily from greater intensities in sound made possible by transducers just emerging from development, says Dr. R. A. Ramey, manager of the new products engineering department for Westinghouse Electric Corp. The new transducer will increase the efficiency of ultrasonics in welding, cutting, grinding, machining, and drilling metals, in degassing metal melts, and in nondestructive testing of large volumes of solid materials.

Panels Can Heat, Cool, Light

You can cool your office or house in summer, heat it in winter, and light it the year round with wall or ceiling panels no thicker than a picture frame. Experimental models of the three-purpose panels are being demonstrated by Westinghouse—it promises they will be commercially available within five years. Panels combine two of man's newest technological advances—thermoelectric refrigeration, which produces cooling or heating in solid materials directly from the flow of an electric current, and electroluminescent lighting produced in glowing panels no thicker than a sheet of ordinary window glass.

Gas Appliances Show New Life

Look for a renewed push to market gas appliances. Gas utilities will give more help to makers of the units. Needed is additional money for product research—at least $12 million a year or about 2 per cent of gross gas appliance sales. Makers of electrical appliances are spending about 6 per cent annually.

Have You Enough Management Men?

Executives are in greater demand this fall than at any time in the last 14 months, says Heidrick & Struggles Inc., Chicago recruiting organization. Its monthly barometer of management openings shows the demand index in

Trend in Metals—Page 75 Market Outlook—Page 109

Metalworking Outlook

September stood at 56, highest since July, 1957, and 19 per cent above the recession's low of 47 last January.

Defense Spending Goes Up Again

Watch for defense spending in fiscal 1960 to hit at least $42 billion, vs. $40.8 billion this fiscal year. Inflation and the cold war are the main reasons for the expected increase. You in metalworking will sell $15.9 billion in goods and services to the Pentagon in fiscal 1959 and are also participating prominently in Defense's $2.1 billion research and development program. That share will rise proportionately next year.

How Roads Boost Steel

Every new mile of highway you're driving on took 500 tons of steel, on the average. Since World War II, more than 8 million tons have been shipped direct from mills for highway construction, the American Iron & Steel Institute reports. Since mid-1956 when the federal highway program started, total shipments of steel for roads have been at the unprecedented rate of nearly 1 million tons per year. Significance: The highway program has at least 18 years to go. If the present rate of steel use continues (it should exceed 1 million tons in some years), the steel industry has a good road ahead.

Expansion Planning at J&L

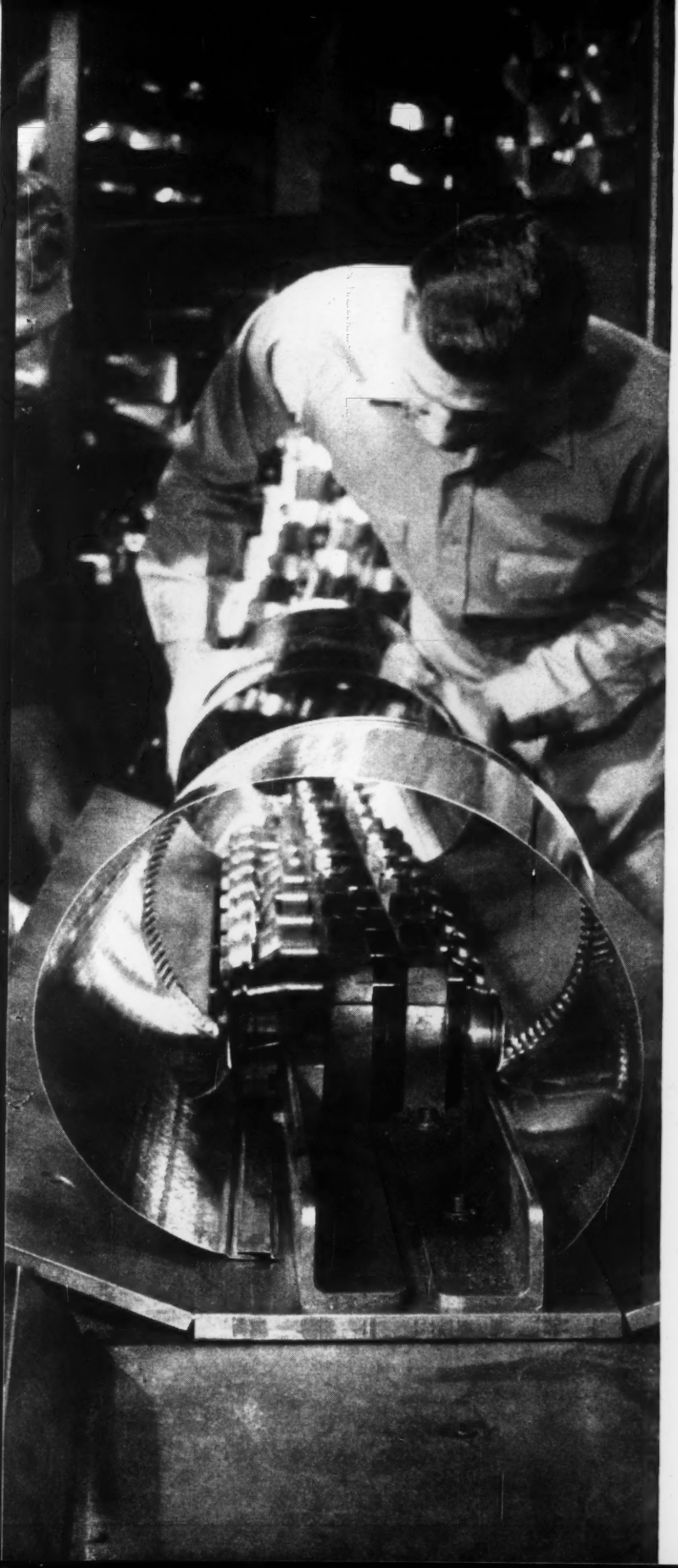
Even if your company doesn't wish to expand now, the forward looking firm has some plans on the back burner in case conditions suddenly change. Take Jones & Laughlin Steel Corp. It doesn't intend to boost capacity in the near future. But for the long term, it's already considering expansion for flat-rolled products, either at Pittsburgh or Cleveland. It's also toying with the possibility of adding to its oxygen steelmaking capacity and installing more coke ovens.

Why Copper Prices Gyrate

Hectic price changing in copper is not over. Custom smelters went up 1.5 cents a pound last week to 30 cents and will probably go higher. Anaconda Co. led on Oct. 23 in raising primary copper to 29 cents a pound. Kennecott Copper Corp. followed almost immediately. Besides improved demand, three other factors contribute to pricing gyrations: 1. Higher prices overseas. 2. Small scrap intake. 3. World-wide strike. STEEL's survey on copper (Page 75) shows that skittish prices do the industry no good.

Straws in the Wind

American Motors Corp.'s new labor pact is roughly similar to those signed by the Big Three . . . New nonfarm housing starts hit 118,000 last month, the biggest September figure since 1950 . . . The U. S. population is now 175 million . . . Office equipment sales in September ran ahead of those a year ago, and the rise is continuing this month.



"We just don't worry about chipping or flaking when we lock-seam WEIRKOTE®!"

If those difficult lock-seaming operations give you trouble, it's time to take the step that fabricator after fabricator is taking.

Switch to Weirkote zinc-coated steel as promptly as you can.

Weirkote's continuous process integrates the zinc and the steel so that the most complicated forming operations are made without chipping or flaking. Weirkote can be worked to the very limits of the steel itself—spinning, deep drawing, crimping, heading, twisting, the works. Comes through in perfect shape to give your products lasting anti-rust protection, such as they've never had before.

Can you think of a quicker, easier step to an even better product? To fewer rejects? To more peace of mind? To lower costs? And, perhaps most important, to the greater good will of customers who receive even more value for their money?

Write today for the free booklet that will give you lots of food for thought on the many advantages Weirkote can bring to your products and production. And *now* Weirkote is treated to inhibit wet storage (white oxide) stain. Weirton Steel Company, Dept. B-1, Weirton, West Virginia.

WEIRTON STEEL COMPANY

WEIRTON STEEL COMPANY

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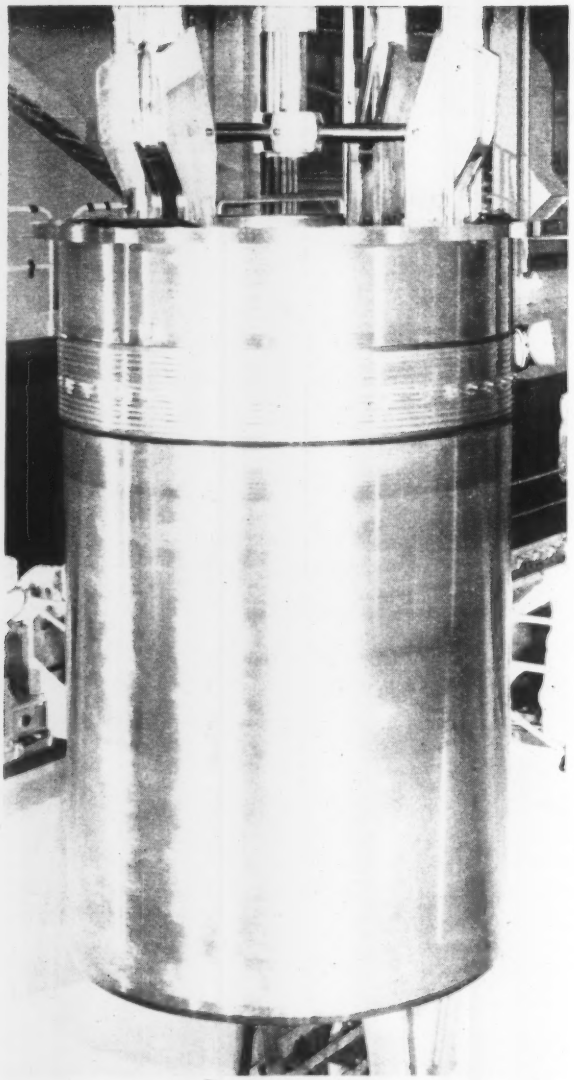
a division of

NATIONAL STEEL CORPORATION

Special Armco 17-4 PH Stainless is used in the mechanism that controls nuclear fission in the core of the United States' first full-scale central station nuclear power plant at Shippingport, Pa., which was built as a joint venture of the U. S. Atomic Energy Commission and the Duquesne Light Company. The nuclear portion of the station was designed and developed by Westinghouse Electric Corporation under the direction of and in technical cooperation with the Naval Reactors Branch, Atomic Energy Commission. Duquesne Light built the turbine generator portion of the plant, contributed $5,000,000 toward the construction of the reactor plant and is operating the entire station.



How Armco Stainless Steels Help Put Atoms to Work

Nuclear power plant systems designed to tap the power of peaceful atoms benefit from the unique advantages of stainless steels. Critical parts of reactor control mechanisms, for example, have greater strength and hardness because of Armco 17-4 PH, a special precipitation-hardening stainless grade.

But the jobs performed by other types of high-quality Armco Stainless Steels are vital too in the nuclear power plant. In equipment exposed to radiation, the dense, smooth surfaces of stainless steel are easier to decontaminate. They last longer with little upkeep which cuts down on hazardous contact maintenance.

FOUR-FOLD BENEFITS

Beauty, strength, easy maintenance, durability—all are combined in Armco Stainless Steels. They are four good reasons why products and parts *of all kinds* sell easier, last longer, and work more efficiently when they're made of these bright special steels.

For complete data about top-quality standard and special Armco Stainless Steels, in sheet, strip, plate, bar, and wire, just mail the coupon or call your nearest Armco Sales Office today.

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Please send me full information about Armco Stainless Steels in ☐ sheet and strip ☐ bar and wire

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ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

What Price Obsolescence?

The uptrend in business activity that started in May shows every indication of continuing into 1959.

We may even be at the threshold of the new era of expansion and prosperity many people have been predicting for the 1960s.

Are you ready?

You aren't if you canceled or postponed plant expansion and deferred replacement of obsolete equipment during the recession.

You should also be ready to contend with spiraling wage costs. Auto wage settlements hint that the increase may be slower than anticipated. But the real test will come when the steelworkers negotiate for new contracts next June.

It will be difficult to offset rising labor costs by asking more for your products. Price increases are unpopular with the public and the government.

So management faces a tighter squeeze on profits and added pressure to reduce costs.

What's the best solution to the dilemma?

We think there are three things to do:

1. Try to determine whether the products you make will still have a market in the next few years.

2. Decide whether you have enough capacity to meet the demands of a population that will grow from 175 million today to over 240 million by 1975.

3. Most of all, find out right now whether your production costs are competitive with the equipment you now have.

Chances are you already know what machines can no longer pay their way and what new equipment is needed.

Don't wait to replace that equipment until it is fully depreciated for tax purposes.

A new machine can pay for itself in less than two years. Even in this recession year, industry is buying more than 2000 machine tools a month in the fight to reduce costs.

The useful life of equipment depends not on its age, but on how fast and how economically it can turn out work.

Can you afford the high price of obsolescence?

Irwin H. Such
EDITOR-IN-CHIEF

A new problem facing steel users today

The danger of losing money by relaxing inventory controls

When the slump set in last year, big inventories were one of the toughest problems for most companies.

Now, as the economy swings back, these problems may seem to have disappeared. Actually, the problems of inventory cost and risk are always with us—just as much a threat to profit in good times as in bad.

But with the urgency of strict economies reduced, there is a very real danger that many companies will be caught off guard—a danger that recession-born practices will be abandoned as temporary emergency measures without careful enough analysis of their profit potential.

For example, companies that modified their steel inventory policies to avoid long-term commitments found that many costs were reduced and their needs better served. By taking advantage of the stocks offered by steel-service centers, these companies were able to release working capital for more productive purposes, free valuable storage space, reduce handling costs and lower scrap losses, insurance, taxes, etc.

Proof in dollars and cents

Those who carefully weighed all the advantages found reason for a *permanent* modification of their previous buying practices. They proved to themselves that they could and should rely much more heavily on steel-service centers because it makes sense in dollars and cents.

This conclusion is especially sound when you consider the unusually broad scope of Ryerson stocks and the speed and dependability of Ryerson services. Any kind, shape and size of steel can be shipped to you from Ryerson in a matter of hours. And your steel can be furnished in ready-to-use form, saving time and initial-cutting cost. You gain complete flexibility to meet quick shifts in production schedules. And you have the added assurance of getting steel of uniform, high quality—the unequalled dependability of Ryerson *certified* quality.

Your Ryerson representative is well qualified to review the facts and help you get the maximum value for your steel buying dollars. Ask him to analyze your requirements with you the next time he calls.

What it costs to carry inventory

IRON AGE magazine says: "*A survey of eight plants shows that, for every $100 worth of materials bought, the average yearly inventorying cost is $19.37.*"

Other authorities say the real cost of steel placed in inventory for extended future use may be as high as 40% more than the invoice price.

RYERSON CERTIFIED QUALITY

RYERSON STEEL®

Member of the INLAND Steel Family

***Principal Products:** Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.*

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Wire Products Dominate Foreign Steel U. S. Buys

(Net tons)

1957 Imports as percentage of total supply†	PRODUCT	1958*	1957	1956	1955	1954
52.5%	Barbed wire	60,000	63,775	62,297	60,084	53,380
23.3	Nails and staples	165,000	134,838	111,095	130,598	91,406
13.1	Woven wire fence	37,000	30,135	21,991	13,136	10,436
6.8	Reinforcing bars	340,000	160,371	173,300	158,969	163,977
5.5	Sheet piling	6,750	31,808	32,615	5,364	1,811
3.6	Structural shapes (3 in. and over)	80,000	236,663	316,057	104,706	123,276
3.2	Round and flat wire	140,000	85,380	62,613	48,023	46,737
1.9	Pipe and tubes	150,000	190,727	140,365	77,107	79,589
1.9	Semifinished	120,000	62,429	92,230	193,864	48,625
0.3	Plates	6,500	22,166	49,747	1,697	1,681
0.1	Sheets and strip	7,500	25,782	36,516	39,288	25,866
1.5	All steel products	1,235,000	1,153,702	1,334,338	970,022	783,657

*Estimated by STEEL.
†Total supply equals American industry shipments and imports, minus exports.
Statistics: Commerce Department.

Memo to Steelmen: Imports Rising

Even the recession didn't stem the tide. Outlook: Shipments from abroad will be up still more in 1959 as foreign producers cash in on their low costs

FOREIGN metal producers are looking more covetously at your customers. They're shipping a broader range of products into a wider section of this country. They're selling with ease when they can undercut your prices because their quality is generally good.

Department of Commerce statistics show imports of all steel mill products came to 1,153,702 tons in 1957. STEEL's estimate for this year: 1,235,000 tons. Imports have climbed steadily since 1954, although the 1956 figure (1.3 million tons) was abnormally high because American mill shortages forced buyers to go abroad.

• **Extent of Damage**—Steelmakers point out that four product groups (structural shapes and piling, wire and wire products, pipe and tubular products, and reinforcing bars), accounted for 86 per cent of mill products imports in 1957.

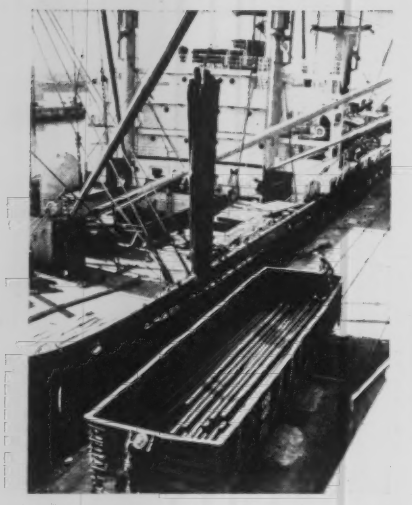
Barbed wire imports of 63,775 tons in 1957 contrasted with American mill shipments of 59,125 tons.

Some 23 per cent of the supply of nails and staples in this country last year came from abroad.

A major eastern wire seller estimates that American wire producers will lose 35 per cent of their potential 1958 sales to foreign suppliers.

• **More Coming**—Steelmakers are meeting the threat aggressively, but they don't predict an early end to the incoming flow. Their forecast for 1959 and beyond: "More and heavier competition."

Reasons for the interest of foreign manufacturers in American markets are easy to see. The dynamic metalworking industry chews up impressive tonnages, even in a



Another cargo of foreign pipe enters Houston, on its way to an American customer. Competition with U. S. mills is being stepped up

recession year. World-wide surpluses of many metals force suppliers to look farther for markets. It's a trend which hurts nonferrous metals, too.

Here's how imports affect suppliers of the hardest hit items:

• **Structural Shapes** — A Milan, Italy, steel firm underbid an American producer by $60 per ton to win a contract for 2400 tons of light gage structural steel for a Buffalo-area power project.

• **Bars** — An eastern producer of hot-rolled bars says: "Some customers bought European rounds and flats for $20 to $30 per ton below our quotations."

• **Tubular Products**—Oil country seamless tube mills in the Pittsburgh-Youngstown area report stiffening competition along the Gulf of Mexico, where foreign pipe undersells their product by as much as 15 per cent. With American seamless tube capacity concentrated in Ohio and Pennsylvania, the area is a weak spot for sellers of that product.

• **Wire**—"The situation is grim," says an eastern producer: "We're hurt, and foreign competition will be greater in 1959."

• **Barbed Wire**—Imports (largely from Belgium, Luxembourg, and West Germany), tapered off slightly in the first half of this year. Some 28,760 tons entered the country, compared with American mill shipments of 38,547 tons. This suggests that foreign producers don't want to take more than 50 per cent of the American market for that product.

The statistics hold no comfort for producers near the Atlantic Coast. Atlantic Steel Co., Atlanta, reports its sales of barbed wire in 1957 were 84 per cent below what they were in 1953. Spokesmen say imports into the firm's area increased 412 per cent between 1953 and 1957. In first half of this year, sales of that product continued to dip while foreign wire penetrated deeper into the firm's marketing area.

Three trends presage more headaches for American steelmakers. 1. A growing number of mill products are affected by imports. 2. More nations are looking to exports as a way to bolster lagging home consumption. 3. Foreigners are able to undersell American producers in a wider area of this country.

• **More Products** — A midwestern sheet producer observes: "West Germany makes good auto body sheets. I wouldn't be surprised to see growing shipments to Detroit in the next five years."

• **More Exporters**—Steel executives say that Russian structural steel, pipe, rails, and other heavy steel products are beginning to be exported. A. S. Glossbrenner, president, Youngstown Sheet & Tube Co., Youngstown, warns: "We are not competitive economically with the Soviet steel industry. We will learn this the hard way when they push into world markets."

• **Wider Area**—Great Lakes area steelmakers add: "Foreign competition is on the rise in the Midwest. Opening of the St. Lawrence Seaway heightens it. German barbed wire sells in Cleveland for $40 a ton less than the American product after being freighted from New York to Cleveland by rail. The seaway will make the German product cheaper."

Steel is entering the West Coast at a more rapid pace. Tube imports in that area have climbed 23 per cent since 1957, a major American supplier reports. In the first half of 1958, 35,000 tons of steel products poured into San Francisco, compared with 1957's total of 49,351 tons (and 14,208 tons in 1953).

How can steelmakers compete with foreign industries whose wage scales are far below those of American labor? Producers gave STEEL three suggestions: 1. Hold imports down. 2. Build new plants in areas affected by imports. 3. Cut costs.

• **Limiting Imports**—Requests for greater protection against imports meet two objections: 1. Foreign industry must remain strong as a bulwark against communism. 2. Exports of mill products (5.2 million tons in 1957), outweigh imports. Higher tariff walls in this country could lead to similar barriers abroad.

Steelmakers can explain to Washington that when imports remain below 2 per cent of total supply of a product no one is seriously affected. But disturbances in the normal pattern of foreign trade hurt their industry.

"We suggest that the Tariff Commission be given authority to back up qualified American producers who are suffering from foreign imports. We suggest that a system of quotas limit under definite formulas the annual volume of particular imported products. If our businesses know which and how many goods foreign producers can bring into this country, both they and the foreign firms can plan in accordance," says an Atlantic Steel spokesman.

Suggests a Pittsburgh steelmaker: "Unions have as much to lose to foreign competition as management has. Since they seem to have more political influence than we have, why don't they take up the fight?"

• **New Plant**—The location of a new steel plant in the Gulf area could win back some customers for American steel. Last year, 500,163 tons (43 per cent of all imports), entered through that coast's customs district. More steel entered through Galveston, Tex., than through any other American port.

• **Greater Productivity** — "If the American workman can keep his wage costs from mounting, and if we can build our productivity faster than other nations can, we will be able to meet foreign competition equally. If not, we'll see a steady gain in incoming steel while our industry prices itself out of world competition," concludes one steel executive.

Westinghouse, GE Buck SUB Trend

They have sold many employees on savings plan as counterproposal but IUE bosses aren't buying. Independents may accept it to embarrass IUE's Carey

LABOR OBSERVERS think the savings and security plans offered by General Electric Co. and Westinghouse Electric Corp. stand a fair chance of being accepted by the independent United Electrical, Radio & Machine Workers of America (UEW).

Reason: It would "embarrass" James B. Carey and his AFL-CIO International Union of Electrical, Radio & Machine Workers (IUE), who flatly rejected the plans.

UEW would like to pull some members away from the big IUE. UEW leaders reason that the security plans, though management contrived, would be better than a mere continuation of the present contract—which seems to be the only alternative. Both GE and Westinghouse have rejected any form of Supplemental Unemployment Benefits—the major item sought by the IUE.

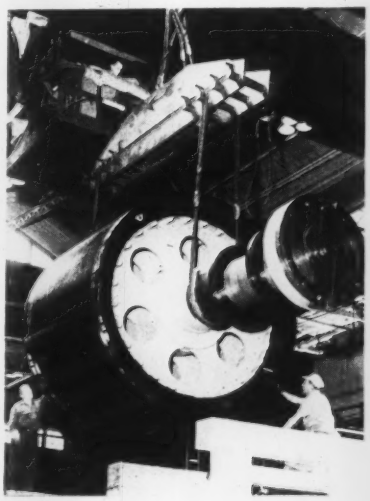
One veteran labor observer says Mr. Carey won't accept the savings plan because it would tend to draw employees closer to management's interests. The same observer believes UEW has "everything to gain and little to lose. If it accepts the plan and investments pyramid, its members will have a laugh on employees belonging to the IUE. That would make a good talking point when the UEW is recruiting members," he continues.

• **Reopener**—Westinghouse and GE made their counterproposals during contract reopenings limited to employee security. IUE found eight demands to make in that realm—including SUB, some form of guaranteed wage, or a shorter workweek.

Both companies rejected SUB and countered with plans claimed to be better deals for the workers.

• **Security Plan**—The key in each counterproposal is a savings plan. The Westinghouse version would work like this: An employee could place up to 4 per cent of his annual earnings in an individual savings account; the corporation would add 15 per cent to the total accumulated over a three-year period. Participation would be voluntary; savings would be invested in Westinghouse common stock, U. S. "E" bonds, or both. Under GE's plan, an employee could put up to 6 per cent of his earnings in an account for the purchase of stock and bonds. GE would match each dollar with a 50-cent contribution. Employees could draw on their accounts in emergencies. Westinghouse is offering a separate "emergency fund" setup.

Should any of the larger unions accept the plans, it would be a major victory for the companies. So far, all five big groups—IUE, UEW, IAM, IBEW, and the Westinghouse federation—have rejected the proposals. Some of the smaller unions have not committed themselves. Acceptance of the plan among GE's nonunion employees has been high; a company spokesman says 97 per cent of the nonunion personnel have signed up.



THIS 49-TON ROTOR will become a part of the first automatic card-programmed rolling mill operation in Mexico. It is part of a $5.5 million electrical apparatus order being sent to Cia. Fundidora Iron & Steel, Monterrey, Mex., by International General Electric Co., a division of General Electric Co.

• **Virtues for Companies**—The plans would add comparatively little to the firm's employment costs under current five-year contracts (which run to October, 1960). Since much of the savings would be invested in company stock, the plans provide a new source for direct financing. They also offer a wide base for employee stock ownership. In a way, they give bluecollar workers the values of deferred payment plans and stock options normally limited to the brass.

• **For Employees**—GE won wide acceptance of its stand among rank-and-file employees. Through a concentrated campaign by letter and in the press, GE dramatized the effect a strike would have on communities where its plants are the main employers. Three IUE locals, representing more than one-third of the membership, voted against a strike—leaving Mr. Carey with no means to back up his SUB demands.

Some workers look at GE's proposal this way: A man making $100 a week can put $6 into his account. The company adds $3. At the end of three years, the employee has $1400—plus whatever amount the stock has appreciated. That sounds better than a $3-a-week raise.

• **Status**—But chances that the IUE will accept the plan—or that the two electrical giants will agree to SUB—are slim. When Westinghouse resumes negotiations Wednesday (Oct. 29), it will still be firmly behind its original offer; it might juggle the terms or sweeten certain parts slightly, but won't make a radical change.

GE says further talks with the IUE would be futile. A GE spokesman claims Mr. Carey isn't interested in discussing the company's offer but "prefers to filibuster on SUB." Both companies will continue talks with other unions.

20 Types of Men in Short Supply

YOU RECRUIT men today to be the next decade's middle managers. So you have to anticipate shortages. Here's a report from Hoff, Canny, Bowen & Associates, New York executive placement firm. It shows the scientific-technical executives who'll be in greatest demand. . .

THIS YEAR—	IN FIVE YEARS—	IN TEN YEARS—
Chemists	Mechanical engineers	Chemists
Industrial engineers	Industrial engineers	Electronic engineers
Electronic engineers	Chemists	Electrical engineers
Mechanical engineers	Chemical engineers	Mechanical engineers
Electromechanical engineers	Electrical engineers	Physicists
Chemical engineers	Electronic engineers	Chemical engineers
Physicists	Electromechanical engineers	Industrial engineers
Electrical engineers	Physicists	Petroleum engineers
Mathematicians	Metallurgical engineers	Fuels engineers
Statisticians	Organization planners	Mining engineers
Architectural engineers	Operations research experts	Textile engineers
Petroleum engineers	Systems and methods specialists	Geologists

Top Talent Is Tougher To Get

You'll run into severe competition in recruiting top college seniors this year. But it will be easier to hire the average graduate. Top recruiters give hunting tips

METALWORKING'S college recruiting activities, cut back last spring, will be curtailed even more this year. But competition for top flight seniors has intensified, and bidding for scientific-technical graduates whose grades put them in the top quarter of their classes is brisk.

Reason: Firms are preparing for the shortage of scientific-technical managers they anticipate in the coming decade. (See list above.)

• **The Trend**—STEEL asked 50 blue-chip companies for their college recruiting plans covering this school year. Their answers:

Eight will visit more schools this year than last.

Eighteen will visit the same number. (Many emphasize that the effectiveness of a college recruiting program depends a lot on continuity.)

Twenty-four will recruit at fewer schools. Some cutbacks are large. Examples: Babcock & Wilcox Co., New York, has 76 schools on its list this year, vs. 106 last year; Motorola Inc., Chicago, 75, vs. 92; Aluminum Co. of America, Pittsburgh, 60, vs. 90; Monsanto Chemical Co., St. Louis, 100, vs. 135.

• **The Why of Cutbacks**—Main reasons given for the decline in recruiting activities this year:

1. Greater selectivity. Many firms will concentrate on top students from top schools.

2. Need for fewer recruits. Some companies found, during the recession's depths, that they could get along with fewer people than they thought were needed. One large company cut back its white-collar staff by 15 per cent last spring. Its comment: "The work gets done just as well; the only change has been a shortening of coffee breaks."

3. Need for specialists. Some personnel managers foresee a serious shortage of men with special training. One type mentioned frequently is the man with a combination of technical and administrative skills. So some firms talk more often with the individuals they want to hire.

4. Re-evaluation of requirements. Monsanto reports the recession has resulted in greater self-examination "followed by more centralization and streamlining of our college visit program." Pittsburgh Plate Glass Co. has "appraised the colleges we visit more carefully to determine the best sources."

• **Implications of Cutback**—Now is a good time for the small or medium sized manufacturer to board the recruiting bandwagon. He'll find competition less severe for the average graduate. He'll find students signing up for more interviews with companies they know little about. And he'll find the salary level easier to live with.

• **Salaries**—Personnel men speculate that starting salaries, which have climbed rapidly under the intense competition of the last few years, may stabilize this year. They look for a 2 to 5 per cent increase (over last year's $460 to $500 per month) for outstanding scientific-technical graduates. But most think that other recruits will be hired at last spring's pay rates ($400 to $450 for above average nontechnical people).

• **Cost of Recruiting**—Holding the small firm (and some larger firms) back are the costs involved in col-

lege recruiting. You can figure about $500 per man hired—not including the salaries you pay your pro tem recruiters. The biggest item is traveling expense—for the recruiter to visit the school and for the student to come to your plant. Add the cost of food, lodging, the literature you distribute, advertising, and your recruiters' time and you may come up with as much as $2000 per man hired. Trend: Paying recruit's moving expenses.

• **GM's Plans**—David F. Waggoner, director of salaried personnel placement, General Motors Corp., doubts that competition will allow GM to hire as many electrical engineering graduates as it needs. It expects to pay $485 to $490 for technically trained people; $25 to $30 less for others. GM sends corporate representatives to schools; picked applicants are referred to divisions hungry for their skills.

Union Carbide Corp. recruits on a decentralized basis. Although each division acts independently, the central office co-ordinates activities.

• **Tips**—Jones & Laughlin Steel Corp. believes in making talent scouts out of such men as its chief engineer, controller, and general manager of sales. Explains Carl Brunt, co-ordinator of recruitment: "We're looking for men with management potential, so we have no misgivings about using high priced talent to find them."

Inland Steel Co. hasn't cut the scope of its recruiting even though its requirements are 15 per cent lower than last year's. Says Frank Cassell, director of personnel administration: "Continuity is important; the colleges get to know you and your needs; students become more familiar with the company."

On International Harvester Co.'s recruiting teams are a manufacturing representative, an engineering representative, and a personnel man. When looking for salesmen, a district sales manager is added; when an accountant is sought, an accounting representative goes along.

When you make a date with a college to interview students, keep it. If you can't, cancel it at least two weeks before you're scheduled to appear. "You'll only breed ill will if you don't," cautions Dale Barbee, director of placement, Case Institute of Technology, Cleveland.

Allis-Chalmers Mfg. Co. says its best advice to recruiters is to "sell the whole company."

Bell Aircraft Corp. believes it's a good idea to interview promising underclassmen for summer employment while recruiting seniors.

"Don't oversell or overglamorize the job and its prospects," warns Allegheny Ludlum Steel Corp.

"Try to speak to all interested students in a mass meeting," advises Motorola.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Profile of a College Senior

BOB HAHN, a senior in electrical engineering at Case Institute of Technology, represents the thinking of many outstanding college seniors. His comments indicate some areas the college recruiter should give thought to:

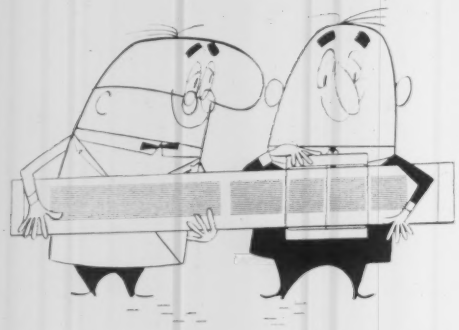
• He believes opportunity and stability are the most important considerations in picking an employer. He says many seniors want companies to offer opportunities for vertical advancement and horizontal change (say from engineering to sales).

In looking for stability, students are shying away from firms that depend heavily on government contracts. "Defense cutbacks have been given a lot of publicity; we're extremely cautious," Bob says.

• Bob believes the plant visit is probably the most effective recruiting technique. "We can learn some specifics," he says. Students generally want more information than they are given. The areas: A company's markets, organizational structure, research facilities, and products.

Other highly praised recruiting techniques: 1. Offering summer jobs to undergraduates. 2. Sending top men to speak at fraternity (social and professional) meetings. Using on-campus exhibits showing new products and areas of research. 4. Sending two-man teams to interview seniors—a personnel man who can tell about your firm's needs, policies, advantages; and a top flight man in the specialty for which you're recruiting (send an engineer to get an engineer).

• Bob doesn't like recruiters who: 1. Type cast an applicant without thoroughly exploring his potential. 2. Fail to give specific information about their company and the job to be filled. 3. Ask applicants for too much information at the first meeting. 4. Allow too little time for the interview; a half hour should be the minimum, Bob thinks.



Engineers do more engineering when . . .

Technicians Do These Jobs:

- **LABORATORY**
  Assist in operating test equipment, gather data, analyze data, present information to engineers for further analysis.
- **DESIGN**
  Assist engineers in design calculations by helping with slide rule work and computer programming; assist in making layout sketches and drawings other than drafting.
- **SALES**
  Assist sales and application engineers in solving customer problems.
- **RESEARCH & DEVELOPMENT**
  Work closely with engineers in designing, fabricating and testing, and reporting on new ideas.
- **MANUFACTURING**
  Do liaison work among manufacturing, engineering, and sales so delivery dates can be met.

Technician Training Pays

TECHNICIANS are saving wear and tear on Allis-Chalmers Mfg. Co.'s professional engineering talent.

Although the shortage of engineers is less serious than a year or so ago (see story on Page 38), they're certain to become scarce again as the economy improves. But even so, the Milwaukee firm now finds it profitable for technicians to take over on more routine duties, freeing the professional men for more creative jobs.

• **Allis-Chalmers' Answer**—Pinched for engineers between 1955 and 1957, the firm shouted for more technicians, only to discover that they, too, were hard to find. So it began a program to train its own in mid-1956. Two years' experience show these results:

1. Engineers' efficiency and morale increased when they were relieved of routine.

2. A previously untapped source: Men who drop out of college. Because of incomplete training, these men with some engineering background had trouble fitting into industry. Technical training was a natural step for them. Many are continuing their education through evening college sessions under an Allis-Chalmers tuition refund plan.

3. Turnover of technicians has been substantially lower than that of engineers. Of 61 trainees to date, only three have dropped out of the course. All three decided to attend engineering schools.

4. Department supervisors report technicians' performance is high. Continuing education and training assures continued improvement.

• **Spadework**—"We designed our program after a detailed survey of every engineering department's needs," relates Frank Churchill, supervisor, Technical Training Dept. "We accomplished this by frequent conferences with chief engineers."

Allis-Chalmers' philosophy in training technicians is to give them a broad knowledge of fundamentals rather than to prepare them for specific job assignments. Most instruction is by members of the training staff and department supervisors.

• **Training Schedule** — A three-month classroom course concentrates on company organization, products and their applications, engineering principles, communications, and basic economics. Some 240 hours are allotted to engineering studies.

Allis-Chalmers allots 178 hours to study of communications. This includes pictorial, written, electronic, and oral methods. Trainees study human relations and group leadership as well as technical reports and business English.

The firm devotes 44 hours to basic economics study. This includes cost analysis and theory and applications. Company organization is the subject of 32 hours of work. Included are shop tours and study of company history and procedures.

"We've developed an interesting approach to our products and applications, which occupy 24 hours of courses," Mr. Churchill reports. "Each trainee selects various product departments for study. He gathers information about the products from engineering, management, and sales personnel. Then he prepares an informal talk on the product's functions, its manufacture, marketing, and utilization."

Classroom sessions are followed by three to 15 months of on-the-job training. Length depends on the individual's ability and educational background. Most trainees have their choice of several jobs.

• **Selection**—Careful screening of trainees is important, stresses Mr. Churchill. They must be high school graduates with above average scholastic and intelligence ratings. Studies in mathematics, sciences, English, and mechanical drawing are desirable.

The firm gives each trainee a battery of tests covering vocational interests, mental dexterity, proficiency in sciences and mathematics, and personality traits. These tests supplement detailed interviews and often pinpoint areas to be stressed during the interview.

As one of the main benefits of its program, Allis-Chalmers reports it has discovered capable individuals whose talents might have been unrecognized. Most technicians prove successful in their assignments. Here are two examples of college "drop-outs," each with about two years of engineering education:

One individual started work at Allis-Chalmers' tank and plate shop in July, 1956. He was soon accepted as a trainee and completed the formal course in February, 1957. He is now assisting in the operation of a Carrollville, Wis., pilot plant testing a new kiln system for processing mineral products, such as cement and taconite. Officials report: "He virtually keeps the plant running."

A second trainee entered the application engineering section of the Motor-Generator Dept. to help solve customer problems. He proved to be a valuable asset through his work in developing applications for Allis-Chalmers' new insulation for motors and generators.

How To Add a Silver Lining

Machine tool distributors brighten the business cloud by sharpening operations. Result: Their share of tool sales is 20 per cent higher than it was last year

THIS YEAR, machine tool distributors will probably account for nearly 75 per cent of all domestic machine tool sales. Their share has grown handsomely in the last year, despite the slump.

How did they do it?

Frank H. Habicht, president of Marshall & Huschart Machinery Co., Chicago, and outgoing president of the American Machine Tool Distributors' Association, explains that the recession has been a "breathing spell."

During the period, most distributors:

1. Added to their sales staffs. The average increase is about 10 per cent.

2. Sharpened sales recruiting and training practices, including refresher courses. Some have gone to extensive aptitude testing of applicants.

3. Re-examined management and management practices to bring them up to date.

4. Sharpened distribution techniques.

5. Sold harder.

Says Mr. Habicht: "Distributors all over the country are proving that selling is really not a lost art."

• **The Future**—At the 34th annual meeting of the association, STEEL asked distributors about future machine tool business. The majority think 1959 will be fair. They expect new orders to exceed 1958's but still be somewhat under those placed in 1957.

One summed it up this way: "We'd all like to think 1959 will bring us a boom. The problem is that when we ask ourselves where the boom business will come from, we have no answer." Inquiries are coming in at a good clip, but there's a suggestion that some only represent planning for 1959 appropriations—they may not materialize into orders.

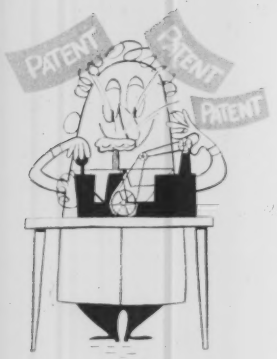
Mr. Habicht points out one source of new business which could begin to pay off next year.

"The need for machine tools has continued (during the slump), and now there is some pent-up demand," he says.

• **Warning**—Mr. Habicht, just back from a tour of Europe, called for accelerated machine tool engineering in this country, "so we can adequately compete in the export markets as well as in our home market. It will take some clever engineering to counteract the difference in labor rates between our skilled mechanics and those of other countries, but I feel it can be done."

As for the quality of foreign machine tools, particularly those of the Soviet bloc, Mr. Habicht feels that U. S. machines still have an edge. But those who believe the U. S. machine tool industry has no real competition from the Iron Curtain countries are "in for a rude shock," he believes.

New president of the American Machine Tool Distributors' Association is J. O. Ellison, president, Harron, Rickard & McCone Co. of Northern California, San Francisco



Faster Patent Action Ahead

PATENT OFFICE executives report the processing time for new patents has been reduced to five months, vs. an average of eight months in 1956. Processing time for amended applications is down to four months. An increase in personnel is responsible. By 1960, waiting time should be down to three months.

Automatic data processing will be the next step. A "pilot run" on mechanical searching of patents is underway; use of a random access memory machine will come later.

The department is also considering duplicate patent facilities in the nation's industrial centers. Patents are available by number in large cities, but searches cannot be made. A new Office of Information within the Patent Office is responsible for getting more patent news to industry.

Information about Russian inventions may be made available to businessmen if conversations last month with the head of the Soviet patent office bear fruit. Our patent people want access to Russian patents and "certificates of authorship," although Russia does not ascribe to the international patent agreements.

Russia Has Good Incentive System

Businessmen, as well as the Patent Office, are becoming more aware of the Russian system, which seems to provide inventors with plenty of incentive. Karl Honaman, director of publications for Bell Telephone Laboratories Inc., notes: "The USSR is moving away from the idea that all people are alike. It is understood that all don't contribute equally and don't desire equal rewards."

Those who work for the Central Technical Information Agency (about 14,000 scientists are part-time employees) receive extra pay for abstracting documents and lecturing. Money, prizes, and prestige are offered to inventors. "Certificates of authorship" are generally preferred in the Soviet to patent grants, he says, because patents are taxable. Certificates may be worth up to $20,000.

How Good Is the U. S. System?

Our attitudes toward invention received attention last week at a Patent Office meeting of electronic industry leaders. Dr. D. B. Sinclair, vice president, engineering, General Radio Co., says that patents are for the protection of useful commercial developments, not awards for scientific achievement. He implies that scientists aren't adequately rewarded.

To help determine what industry can do to encourage invention, Dr. William Baker, vice president—research, Bell Labs, suggests setting a premium on novelty. He points out that things we patent may be obvious to the communists. "Industry should cease to be satisfied with improvements, minor changes, and legalistic changes alone," he adds.

Technology is moving so fast that we are back to "word of mouth" communication among scientists, says Dr. Baker. (By the time an invention is written up in an application, let alone patented, it may be obsolete.)

Science Advisory Committee Reports Due

Calling for the mobilization of the "best judgment and experience in the country," Dr. J. R. Killian Jr., special assistant to the President for science and technology, says a scientific information panel will soon complete a study of the federal government's responsibilities in co-ordinating the acquisition, publishing, translating, abstracting, storing, retrieving, and dissemination of information. Our rate of scientific advance, he notes, is largely measured "by the speed with which research findings are disseminated."

Another report on Uncle Sam's role in formulating research policies is also due. Changes in government programs, Dr. Killian says, cause "perturbation through the whole domain of American science."

Weeks Asks for Manufacturers' Sales Tax

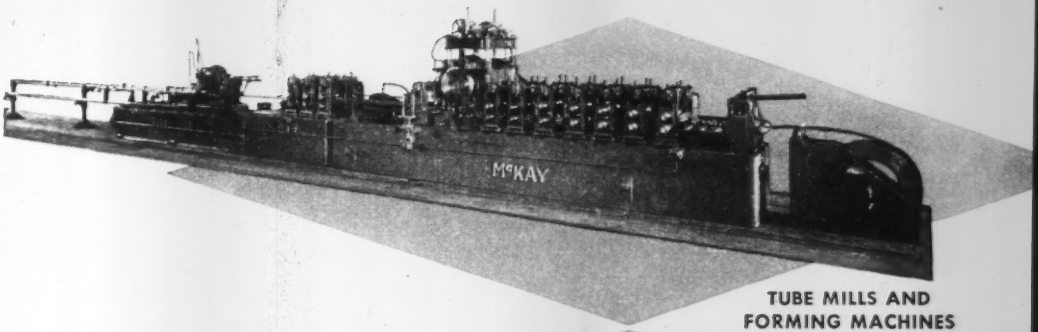
Commerce Secretary Sinclair Weeks (who may be resigning soon) is telling his Business Advisory Council (made up of 80 top industry leaders) that Uncle Sam is too dependent on personal income tax for his revenues. Speaking for himself, not the administration, Secretary Weeks suggests that a manufacturers' sales tax should be recommended to Congress in January.

He adds: The government should allow expenditures for new plants and equipment to be depreciated faster by industry for tax purposes.

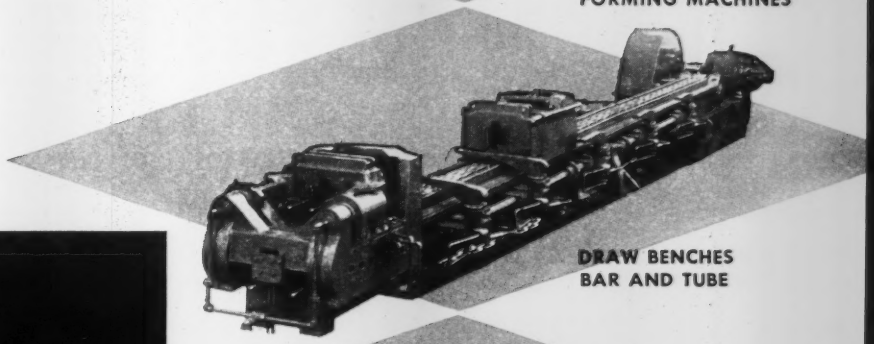
Neither idea is given much chance by Congressional observers.

Space Notes of the Week

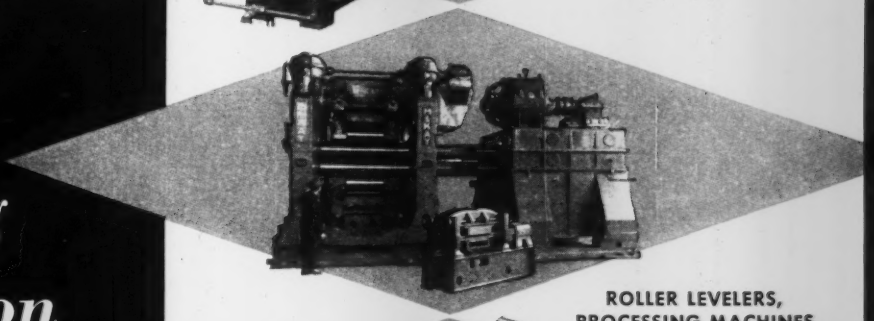
Commerce Department's Office of Technical Services reports Sputnik III was probably launched by a boron fuel . . . Says Rear Adm. John Clark, deputy directory, Advanced Research Projects Agency: "We'd be in a hell of a shape if we didn't have interservice rivalry" . . . The X-15's first powered flight test may come by January, 1959.



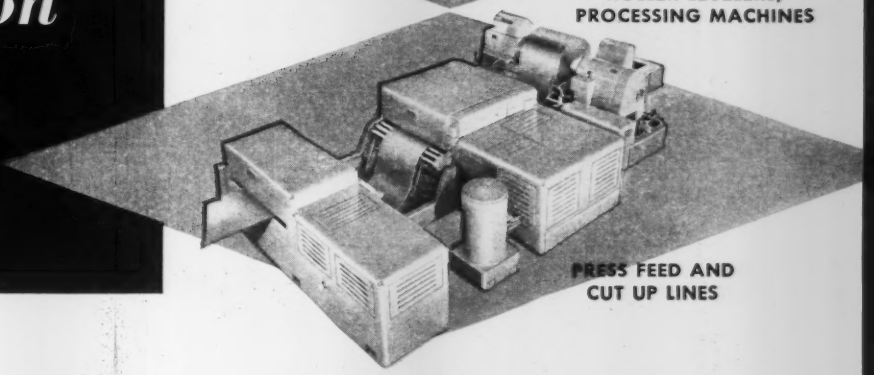
TUBE MILLS AND
FORMING MACHINES



DRAW BENCHES
BAR AND TUBE



ROLLER LEVELERS,
PROCESSING MACHINES



PRESS FEED AND
CUT UP LINES

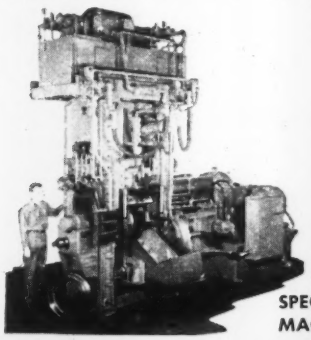
Metal working Automation in action...

If you're in the metal working business, you should be acquainted with McKay *automated* lines available for many metal working operations.

McKay pioneered and has played a leading role in the development of such equipment as that pictured on this page.

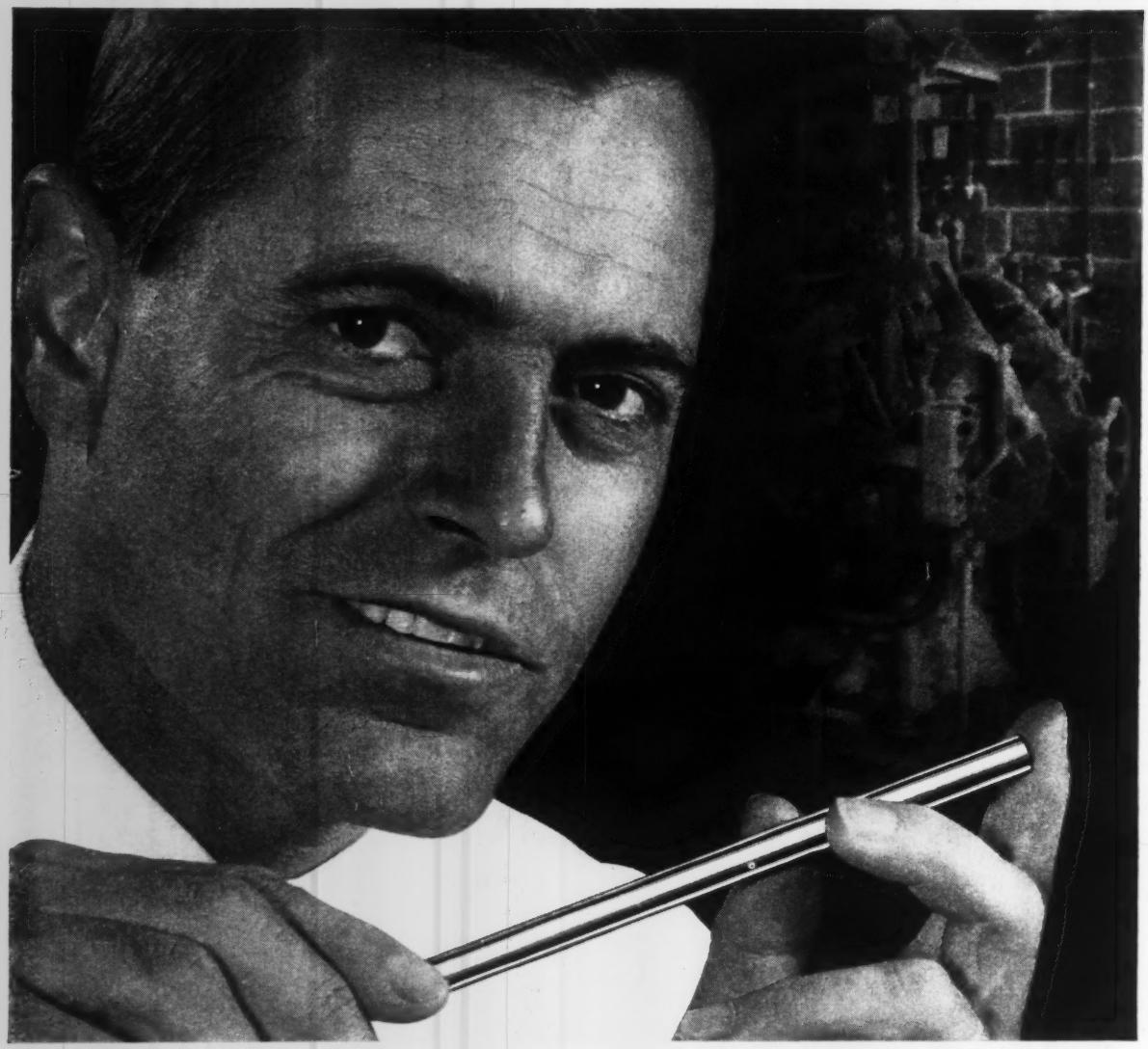
Basic McKay designs can be modified, or special machines developed to meet specific requirements.

THE McKAY MACHINE CO., YOUNGSTOWN, OHIO



SPECIAL
MACHINERY

McK



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and for BRASS FORGINGS, too . . .
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(Subsidiary of The Bristol Brass Corp.)
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Where British Steel Will Be Used

(Millions of tons)

	1958	1962
Shipbuilding	1.1	1.2
Coal mining	0.7	1.0
Railways	1.0	0.8
Construction	.5	2.2
Defense	0.5	0.5
Fixed investments	.9	2.7
Consumer goods (other than cars)	0.4	0.7
Cars for domestic use	0.3	0.7
Exports of manufactured products	2.3	3.7
Tin plate products	0.5	0.8
Exports of steel products	3.9	4.8
Others	2.2	3.1
Totals	16.3	22.3

Britain Expects Improvement

Iron and steel production is still below last year's, but economists are optimistic. Upturn is expected early next year. Auto industry still showing strength

BRITISH iron and steel production hit 368,600 tons in September, 16 per cent under the same month's figures last year.

At that rate, the industry should produce about 19.4 million tons of steel in 1958. (Its capacity is about 23.1 million tons.) Economists expect a slight revival by January, but substantial improvement is not anticipated for another six to nine months.

• **Carbuilding** — The automobile industry is still Britain's brightest economic spot, even though it is experiencing some seasonable declines. The British Motor Corp. predicts steady production for export.

Production of commercial vehicles in not faring quite so well. Weekly output is about 7 per cent under last year's, and exports have dropped around 16 per cent. Industry officials blame the situation on the industrial slowdown in most of Britain's export markets.

• **Dark Spots**—Makers of railroad rolling stock and coal mining equipment are among those hardest hit. Reason: The curtailment of expansion plans until the recession ends. Lower bank rates are expected to encourage manufacturers to dust off blueprints.

• **Pleasant Future** — Despite the slowdown, the United Kingdom's production, employment, and living standards are at the highest in its history, says a report by the U. S. Department of Commerce (Bureau of Foreign Commerce).

Over one-third of the goods manufactured in Great Britain are exported. American capital accounts for a great deal of this. Some 375 U. S. subsidiary companies produced more than $2 billion worth of goods in 1956.

• **Expansion**—The Commerce Department reports that steel capacity is expected to reach 29 million tons by 1962. Coal output will move from about 222 million tons in 1956 to 240 million tons by 1965 and 250 million by 1970.

• **But Still Slow**—The recession still isn't over. The machine tool industry is working well below capacity. Shipbuilders report that shipping companies are reluctant to hand out orders until indications point to increased business in the near future.

Steel scrap stocks at mills and yards are heavier than they have been for many years.

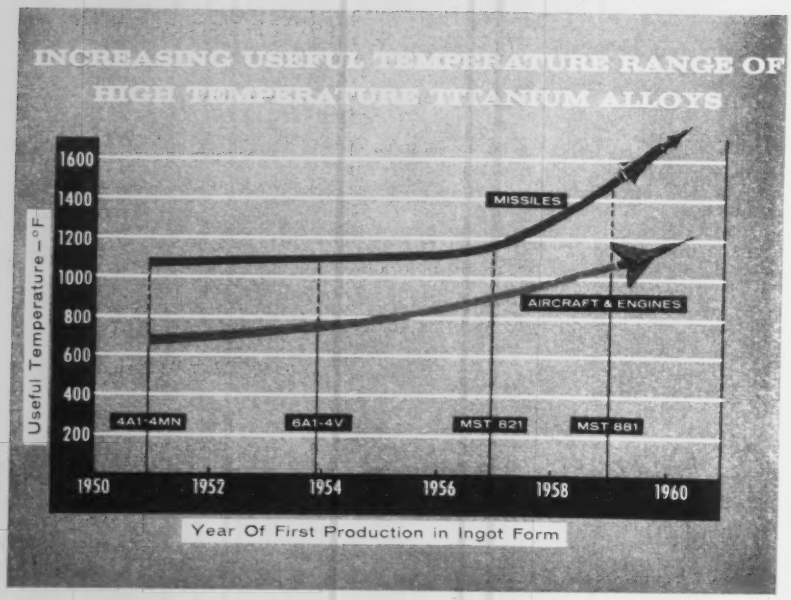
German Output Is Steady

Steel production in West Germany during the first seven months hit about 15.21 million tons, only 1 per cent under the rate in the same period last year. Rolled steel production amounted to 10.14 million tons, matching 1957's figures.

Dr. Hans Guenther Sohl, president, Federation of German Iron & Steel Industries, forecasts an early upturn in sales and production. He bases his prediction on the anticipated end of inventory reductions.

Over 15.6 million tons of iron ore were used by West Germany's steel industry during the first half, about 4 per cent less than consumption in the same period in 1957. Some 8 million tons were imported.

Deliveries from overseas areas accounted for about 42 per cent of imports during the first six months, vs. 38 per cent last year. Newly exploited areas in Canada and South America are becoming increasingly important.



Titanium Busts Heat Barrier

Mallory-Sharon hails MST 881 as the answer to weight problems of jet engines, missiles, and rockets for space exploration. Pentagon is said to be "enthusiastic"

TITANIUM has at last broken through the heat barrier, reports Mallory - Sharon Metals Corp. (jointly owned by Sharon Steel Corp., P. R. Mallory Co., and National Distillers Corp.).

The firm has just announced a new titanium alloy, MST 881, which has the strength of "most steels" for long periods at 1100° F and for short periods at 1500° F. Other alloys lose their strength above 800° F. Alloying elements include 8 per cent aluminum, 8 per cent zirconium, and 1 per cent tantalum-columbium.

• **New Markets**—Describing the Pentagon's reaction to MST 881 as "enthusiastic," Graham Brown, vice president, reports titanium's continued growth is assured. The alloy is "competitive with the finest stainless steel," he says, enabling the Defense Department to plan new high thrust rocket engines at half the weight of current designs.

Mr. Brown sees MST 881 competitive with nickel and cobalt base alloys for jet engines and missile components. Lee Busch, technical director, says the alloy would meet the demands of the X-15, will be particularly important for antimissile components, and could play a big role in the IRBM and ICBM programs where storage is a factor.

He reports: "There is no sacrifice of corrosion resistant properties in the new alloy, and we have to get designers to think in terms of titanium at 1100° F." He points out that the DC-7, which was designed five years ago, has 1300 lb of titanium mill products in it.

• **Availability** — Mr. Brown says customers will not have the usual problems connected with new alloys: Low production and engineering difficulties. Mallory-Sharon has produced more than "laboratory quantities" of it, and it is available as bars, billets, and forging stock. Sheet and wire forms are under development. Consumption may eventually approach 6 million lb a year. It will take up to three years for engineers to design products to use it.

Price of the alloy will be comparable to that of current alloys, about 10 per cent more than steel. Machinability is good, says Mr. Busch; the firm knows little about its weldability so far. Its low resistance may make it applicable to electrical and electronic products.

• **Looking Ahead** — Mr. Brown sums up: Titanium will eventually equal "the spectrum of uses of steel." He did not rule out the possibility that MST 881 may lead to other superalloys with high strength properties above 2000° F.

Rate Test Case Faces ICC

The first major case on competitive ratemaking under the Transportation Act of 1958 is before the Interstate Commerce Commission. Railroads, trying to recapture traffic from trucks, proposed freight rate reductions on paint and some paint products. The action was protested by truckers.

The commission will determine whether rates will be judged solely on the effect on railroads, or if influence on competitive movers will also be considered.

Builds Space Ship Range

Electronic Engineering Co. of California, Santa Ana, Calif., is readying a 400-mile test range for North American Aviation Inc.'s manned rocket, the X-15.

The Air Force-NASA test range will stretch from Edwards Air Force Base to Elv, Nev. It'll be finished Jan. 1, 1959. Cost: About $3 million.

Cargo Missile Developed

A system for delivering supplies by ballistic cargo missile to front line troops has been developed for the U. S. Army by Convair Div., San Diego, Calif., General Dynamics Corp.

Payload sections of the missile (called the Lobber) can be preloaded at supply depots and car-

ried by a team of three men in the field. About 70 per cent of the missiles can be recovered and reused.

To Ship by 'Copter

Opening of landing facility hailed as step toward new era in air transportation

TRANSPORTATION OF industrial material by helicopter is planned by west coast industry. A helicopter landing facility has been opened by Ducommun Metals & Supply Co., Vernon, Calif., metal and supply distributor.

The "helistop" is for public service but has great potential for use by industry.

• **Significance** — "The future may see helicopters replacing trucks for long distance delivery," says Dale Dooley, manager of service. He added that Ducommun will use them for material transporting when adequate load capacity is developed and operating costs are lowered.

Industries have been invited to experiment with transporting personnel in and out of the Vernon area. The helistop is a joint project of the company, the City of Vernon, and the Los Angeles and Vernon chambers.

Import Trends Mixed

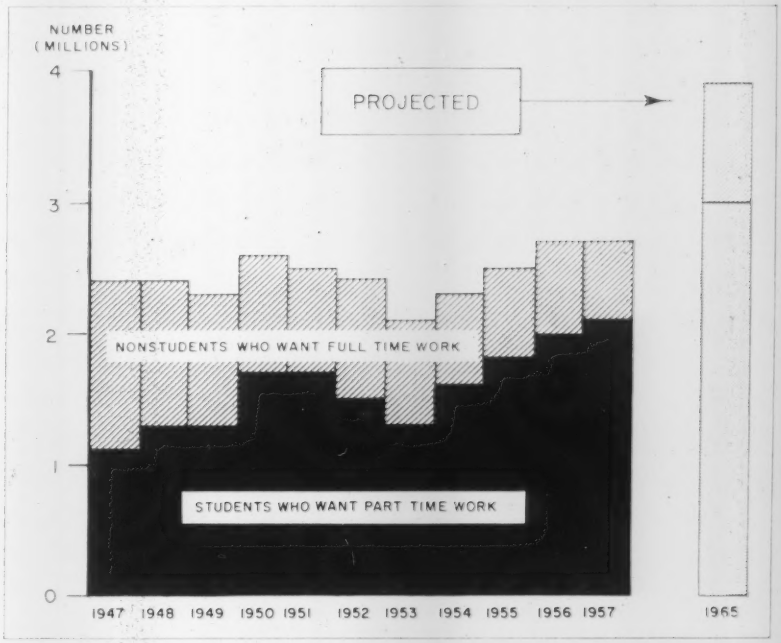
Imports of metals and manufactures dropped from $215.9 million to $152.5 million for July, 1958, compared with July, 1957. (June, 1958: $170.7 million.) Machinery and vehicle imports rose to $111.7 million in July, 1958, compared with $74.2 million in July, 1957. (June, 1958: $83.9 million.) Those are Commerce Department figures.

Over-all imports during July were valued at $1,050 million, 8 per cent below the $1,146 million reported in July, 1957 (the highest July on record). For June this year, the figure was $1,037 million.

Total general imports for the first seven months of 1958 were valued at $7,335 million, 3 per cent less than the $7,595 million reported for the first half of 1957.

More Youths Will Be Wanting Jobs

(14 to 17 year olds in labor force)



Watch This Labor Market

NEARLY HALF of our 14 to 17-year-old population works at some time during the year, usually part time.

That labor market will reach 4 million during October, 1965 (1957 force: 2.7 million). It now accounts for 4 per cent of total U. S. employment.

Those facts are illustrated in a booklet, "Young Workers under 18—Today and Tomorrow," issued by the Department of Labor. This booklet is a planning aid for educators, industrialists, and those responsible for youth work and school activity.

In October, 1956, one-fourth (2.5 million) of the 14 to 17-year-old population held jobs. In July, 1956, the peak of summer vacation employment, 40 per cent (3.8 million) were employed. Nearly half (4.2 million) worked sometime during that year; over 90 per cent worked part time or for short periods.

• **Higher Enrollment**—Compulsory school attendance and child labor laws have increased the number of children under 16 receiving an education. In that age group, 95 per cent of children living in rural areas attend school; 98 per cent of city children are enrolled.

The 16 and 17 year olds are staying in school, too. Rural enrollment was up to 78 per cent in 1957 (1951: 64 per cent). Urban attendance has risen to 83 per cent (1951: 79 per cent).

Over 70 per cent of workers under 18 are engaged in nonagricultural industries. The trend is toward employment in trade and service industries rather than manufacturing.

• **Jobs Come Hard**—Unemployment is highest among young workers. They have difficulty finding jobs due to lack of experience, part time requirements, or, if they quit school, lack of education. However, persons in this age group have the smallest long term unemployment.

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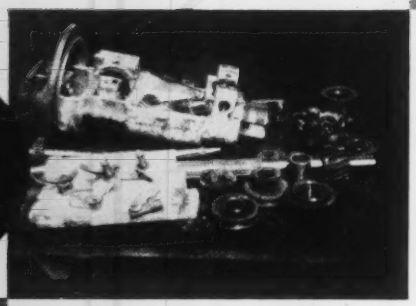

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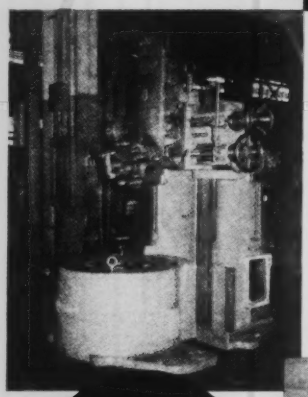

and if found serviceable is re-used, if not, it is replaced.

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1. Thorough workmanship by the same skilled craftsmen that built the machine.
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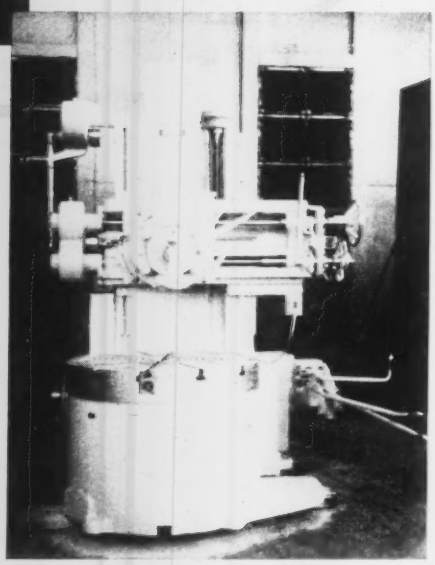
4. One year guarantee on all parts replaced — including labor.



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Renault Counts on Style

This convertible is one of the Caravelle models the French automaker is introducing next spring as an effort to wrest the import lead from Volkswagen

ALL THE NOISE about American economy cars, present and planned, has muffled the fact that imports are taking almost 8 per cent of the U. S. market. (Sales should total 330,000 this year.)

Hillman Minx and Renault are restyling, and Morris Minor has cut its prices as much as $210 to hang on to their shares of this market, which Detroit predicts will account for 350,000-400,000 sales next year.

Perhaps the most interesting maneuver is planned by Renault. While Detroit has been under a verbal barrage to the effect that its cars are too ornate and not functional enough, Renault has decided that some flashiness never hurts. It's introducing the stylish Renault Caravelle in convertible, hardtop, and cabriolet (detachable top) models. The car will arrive next spring. Price: Around $2300.

• **Style Sells**—The Caravelle reportedly is built on the Dauphine chassis, but its new body (styled in Italy) is 10 in. longer. This will give it an over-all length of 166 in. which seems too long for the Dauphine's 90-in. wheelbase. Renault sources here have the feeling that the wheelbase will be longer too. Dauphine's 4 cylinder rear engine will be retained. It has a 51.5 cu in. displacement and turns out 30 hp at 4250 rpm. The compression ratio is 8.25:1. The car should weigh about 1450 lb.

Renault's move is not in the tradition of European carbuilders who frown on styling obsolescence in a market where fewer than 10 per cent of the population own cars.

• **In the U. S.**—But Renault's U. S. sales account for almost 20 per cent of its business, and the company apparently thinks it can expand this by offering American buyers style plus economy. The Caravelle also puts Renault in full competition with Volkswagen, which has been making almost a quarter of its sales with the sporty Karmann-Ghia (port of entry price, $2445).

More than a year ago, Pierre Dreyfus, president and general manager of Renault, told American automakers his company was out to top Volkswagen's import record. At that time Renault was running 70 per cent behind VW in sales. This year its 26,352 registrations (the first eight months) are half those of its German competitor. More important to Renault is that its U. S. sales doubled this year while VW sales have climbed only 20 per cent (40,902 to 52,256).

• **Plans**—Next year, Renault expects

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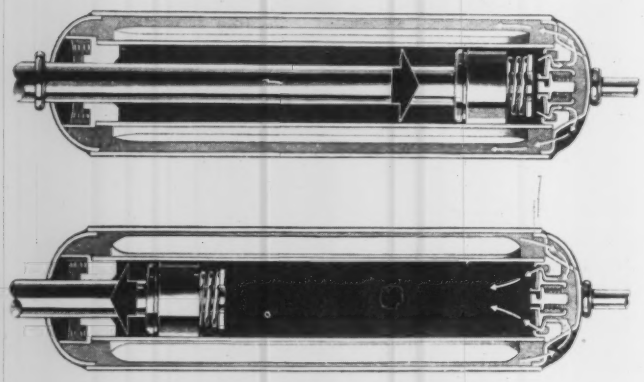

Cadillac Introduces Gas Bag Shocks

Pliable gas bags filled with freon 13 gas will replace conventional air cells in the shock absorber cylinders of all 1959 Cadillacs. James M. Roche, Cadillac's general manager, says the unit prevents mixing of air and oil in the shock cylinders, making smoother riding and better stability. The device, called Pliacell, has been developed by GM's Delco Products Div., Dayton, Ohio.

Regular shock absorbers are composed of a cylinder filled with hydraulic fluid and a piston which moves up or down in the cylinder as the car wheels rebound from the road surface. Movement of the piston forces fluid through small holes in the piston head and at the base of the cylinder where it enters an outer tube or air reservoir. Air in the reservoir may form bubbles in the fluid so it becomes less resistant to piston movement. This sometimes gives an erratic shock action.

The Pliacell shocks prevent this by replacing air in the reservoir with a gas filled nylon bag. As fluid is displaced the gas alternately is compressed and expanded within the bag, eliminating possible mixing of gas and fluid. Since the gas filled cell tends to increase its volume slightly with age, it automatically compensates for small losses of oil caused by evaporation from the piston rod.

to pull ahead. Volkswagen will fight back, but it's reluctant to restyle because this could hurt trade-in values and place an extra cost penalty on European buyers who still take 92 per cent of VW's annual output.

Volkswagen dealers in this country have intimated that the company can dehydrate prices as much as $200 on the Karmann-Ghia, even knock a little off the regular model if necessary. This might be enough to keep the German automaker on top unless Ford and GM appear with economy cars.

How import registrations stand:

	1958*	1957
Volkswagen	76,300	64,242
Renault	38,400	22,586
English Ford	28,000	17,062
MG	15,800	13,496
Metropolitan	12,200	11,791
Others	159,300	77,650
Totals	330,000	206,827

*Estimated by STEEL, calendar year.

White Shows Plastic Cab

White Motor Co., Cleveland, has come up with a Fiberglas truck cab that shows promise for limited production use. Its lighter weight means bigger payloads for truckers.

Discussing the Fiberglas body at a Society of Automotive Engineers' meeting in Baltimore last week, B. C. Harris, White's staff assistant to the chief engineer, said a square foot of Fiberglas for body construction weighs 0.9 lb, compared with 1.5 lb for a similar sheet of steel and 0.93 lb for aluminum.

He adds that although manufacturing costs are higher than with metal cab construction, Fiberglas has more elasticity and will retain its shape. Lower tooling costs and the ability to mold the plastic material in more complicated forms means fewer parts are needed to make a cab and the final cost is comparable to that of metal bodies.

"Care must be taken not to expose Fiberglas to points of wear since it has poor abrasion resistance. This means better floor mats must be used," says Mr. Harris. Because Fiberglas doesn't conduct electricity, instruments and lights must be grounded by some other means than attaching a ground to the body.

U. S. Auto Output

Passenger Only

	1958	1957
January	489,357	642,090
February	392,112	571,098
March	337,049	578,826
April	316,503	549,239
May	349,474	531,365
June	337,355	500,271
July	321,053	495,628
August	180,324	524,354
September	131,952	283,852
9 Mo. Total	2,875,179	4,676,723
October	.....	327,362
November	.....	578,601
December	.....	534,714
Total	.....	6,117,400*

Week Ended	1958	1957
Sept. 20	37,150	52,365
Sept. 27	42,599	51,552
Oct. 4	34,464	21,975
Oct. 11	34,834	38,526
Oct. 18	45,293	72,180
Oct. 25	65,000*	104,987

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

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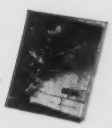

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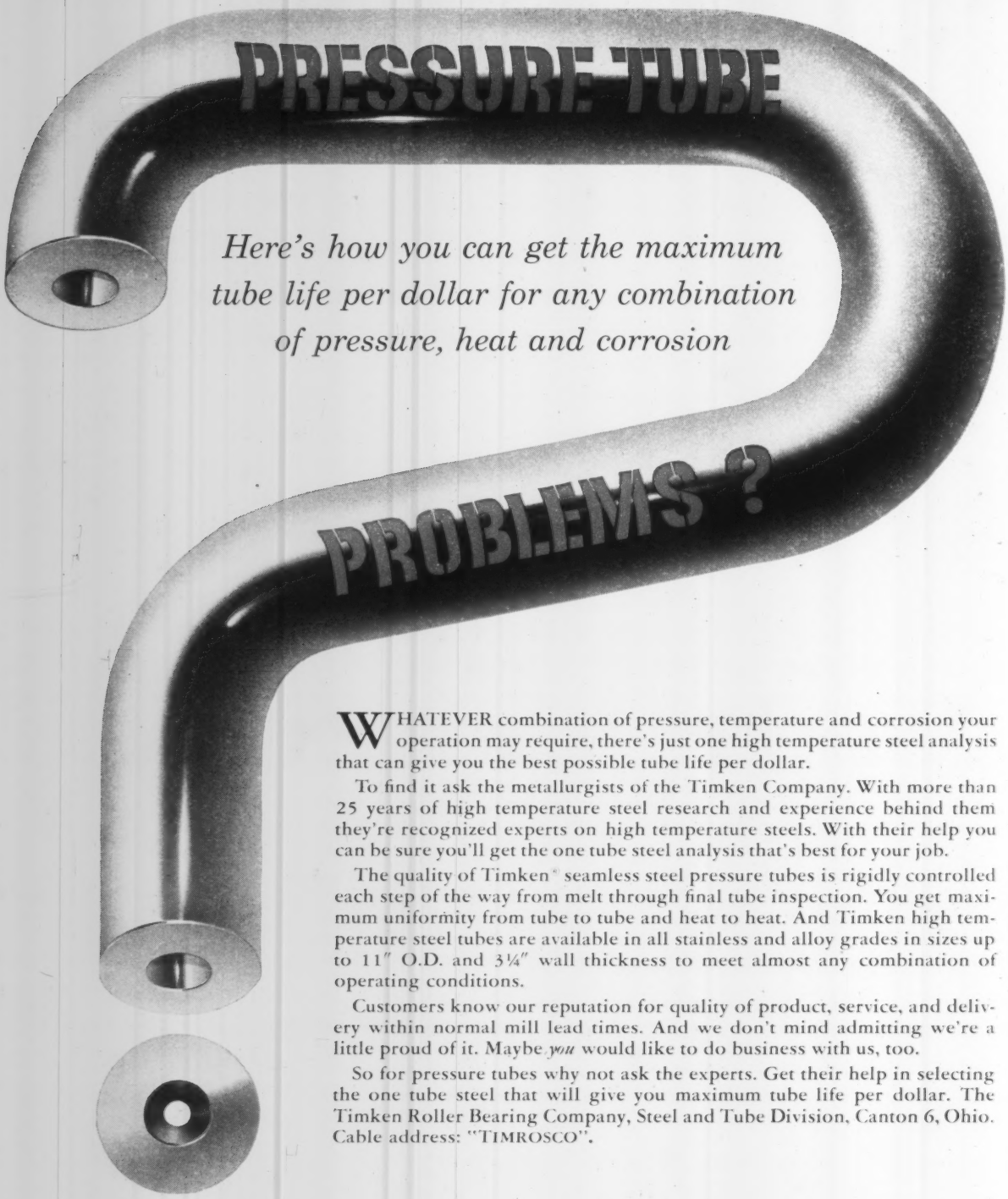

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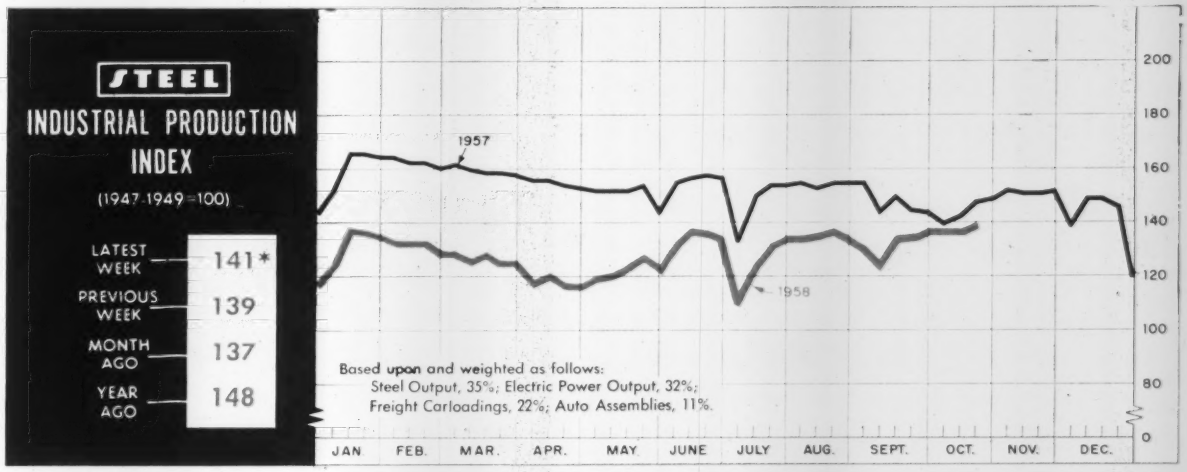

*Week ended Oct. 18.

Auto Output To Give Us Extra Zip

GET SET for a quickened pace of industrial production now that motordom has moved off dead center. The auto industry has been putting the brakes on the fall upturn, but now it is ready to give the economy a push that will boost business indicators to their highest levels in over 18 months.

By late last week, most of the labor disputes in the industry had been settled. General Motors Corp., the hardest hit at the local level, was slowly returning to normal, but normalcy will be fleeting on the quick climb to near record heights of production. Only a shortage of key parts can prevent the highest industry operations since late 1955.

• **How Much?** — Assuming that channels for parts are kept open, Detroit observers think it will take three to five weeks of full operations to fill dealer pipelines. Sales of '59s have not been tremendous so far—because there haven't been many to sell. But firm orders are higher than they were last year and interest in new models is keener, most dealers report. Higher personal incomes may unleash pent up desires for new cars. (The annual rate of personal income in September rose again to $357.5 billion, a new high.)

The two top producers—Chevrolet and Ford—have already indicated they will put on overtime to make up for lost production. American Motors Co. is boosting schedules almost weekly in response to dealers' orders. Some makers say it will be late November before they catch up with backlogs.

Truck producers also are optimistic about 1959 sales. R. C. Woodhouse, general truck sales manager of the GMC Truck & Coach Div. of General Motors, predicts 1.1 million trucks will be sold, including 200,000 for export. That's 21 per cent over the anticipated total for this year.

• **Best Since 1955**—Look for mo-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,018[1]	2,003	2,052
Electric Power Distributed (million kw-hr)	12,100[1]	12,067	11,684
Bituminous Coal Output (1000 tons)	8,520[1]	8,405	9,885
Crude Oil Production (daily avg—1000 bbl)	6,850[1]	6,874	6,747
Construction Volume (*ENR*—millions)	$248.1	$353.1	$312.3
Auto, Truck Output, U. S., Canada (*Ward's*)	61,642[1]	51,964	96,340
TRADE			
Freight Carloadings (1000 cars)	680[1]	686	727
Business Failures (Dun & Bradstreet)	271	301	244
Currency in Circulation (millions)[3]	$31,498	$31,352	$31,191
Dept. Store Sales (changes from year ago)[3]	+4%	+7%	−1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,904	$21,906	$21,799
Federal Gross Debt (billions)	$280.4	$276.5	$274.1
Bond Volume, NYSE (millions)	$33.0	$30.1	$24.1
Stocks Sales, NYSE (thousands of shares)	24,403	19,105	13,158
Loans and Investments (billions)[4]	$94.1	$93.6	$87.3
U. S. Govt. Obligations Held (billions)[4]	$32.0	$31.4	$25.3
PRICES			
STEEL's Finished Steel Price Index[5]	246.65	246.65	239.15
STEEL's Nonferrous Metal Price Index[6]	210.4	208.9	207.4
All Commodities[7]	118.8	118.8	117.7
Commodities Other than Farm & Foods[7]	126.1	126.1	125.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

COLD HEADING COPPER FOR ECONOMY

Copper and its Alloys Offer Almost Unlimited Potential

Thousands of standard and odd shaped fasteners and machine parts are being produced by cold heading copper and its alloys. These ductile alloys are easier to work than most metals and therefore offer increased potential to the designer and manufacturer. As a general guide, the real benefits of cold heading vs machining are realized with runs of 50,000 pieces or more. However, short runs are both practical and economical in many instances.

Cold heading offers high speed automatic production, without scrap loss, plus superior strength and appearance. Cold heading gives close dimensional tolerances, smooth rounded corners and built-in fillets. No burrs are produced. The potential of cold heading is almost unlimited when it is used with secondary operations such as slotting, drilling, tapping, threading, milling, fluting and knurling.

Perhaps our greatest contribution to your operation is our re-design service. An expert cold heading designer can very often study your drawings and come up with a modified part which will be lower in cost, stronger structurally, and easier for you to assemble.

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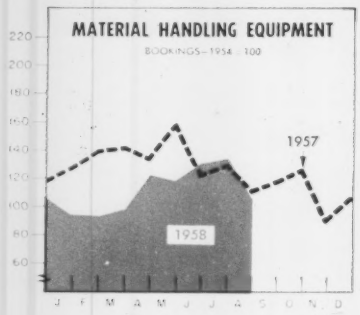
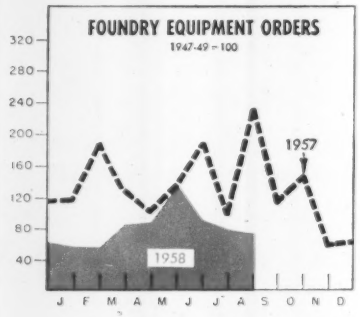
THE BUSINESS TREND



	1958	1957	1956	1955
Jan.	93.07	126.34	122.43	97.00
Feb.	93.49	139.29	129.56	98.71
Mar.	97.89	140.76	166.14	149.16
Apr.	122.36	132.67	145.20	109.52
May	118.04	157.95	155.53	110.50
June	131.15	121.57	189.13	139.00
July	134.34	128.31	165.50	111.76
Aug.	104.46	110.09	168.70	106.20
Sept.	.....	116.79	130.35	136.80
Oct.	.....	124.80	143.38	123.52
Nov.	.....	87.80	138.50	118.09
Dec.	.....	105.65	117.76	139.85
Avg	.....	124.34	147.68	120.01

Material Handling Institute Inc.
Charts copyright, 1958, STEEL.



	1958	1957	1956
Jan.	57.9	117.9	195.6
Feb.	57.6	188.4	169.0
Mar.	85.9	127.0	152.7
Apr.	88.7	101.1	135.2
May	136.1	136.2	207.0
June	87.7	187.5	156.7
July	77.9	98.6	110.3
Aug.	74.1	231.3	188.3
Sept.	....	113.9	114.7
Oct.	....	145.3	122.2
Nov.	....	59.6	121.0
Dec.	....	61.4	115.6
Avg	....	130.7	149.0

Foundry Equipment Mfrs. Assn.

tordom's weekly output to reach about 200,000 cars and trucks at the peak in November or early December. Such a pace would be just a shade under the all-time record set in the fall of 1955. During the local strikes, there has been only a moderate buildup of supplies at the plants. Significance: Thousands of plants supplying the assembly lines will have to step up schedules to meet the demands. For instance, Detroit steel mills are reported ready to boost output as soon as auto lines get into high gear.

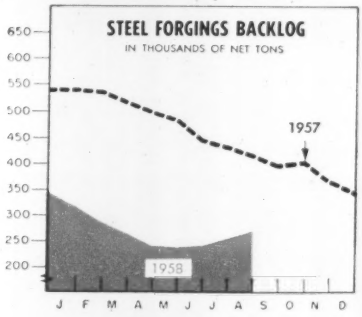
Autodom's revival will have a favorable effect on the output of electricity. At GM alone, lights will be turned on and machinery started up at 124 plants. That will help boost consumption figures in the Edison Electric Institute's Central Industrial Div. Filling pipelines from suppliers to producers to dealers will increase the movement of railroad and over-highway freight —and will partially offset the seasonal reduction in freight carloadings when the Great Lakes iron ore season closes.

Indexes To Regain Losses

STEEL's industrial production index will begin to reflect improvement in Detroit during the week ended Oct. 25. During the latest week, it edged up to a preliminary 141 (1947-49 = 100) on the strength of steadily improving steel operations, record (1958) freight carloadings, and a slight improvement in auto-truck output. Within the next six weeks, the auto industry should add 15 points to the index. Steelmakers will add about 7 more as operations reach a peak of around 85 per cent of capacity during the fourth quarter. Output of electricity, which is due for seasonal improvement, will add another 4 or 5 points. The peak will come in December just before Christmas.

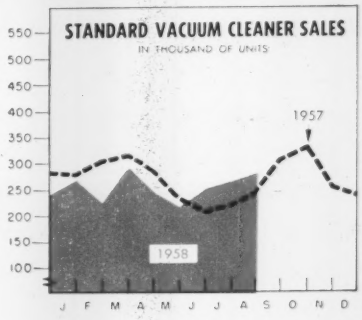
Some of the gains will be canceled by the drop in carloadings, but the total effect will be an index reading in excess of 160 for the first time since March, 1957. The all-time high of 168 (set in the closing weeks of 1956) appears out of reach this year, but it should be topped before 1959 is too old.

The effect on the Federal Reserve Board's production index will be equally pronounced. It registered a 1-point increase in September to 137 (1947-49 = 100), with practically all the gain coming in nondurable goods industries. For October, a similar 1-point increase



	Shipments 1958	Shipments 1957	Unfilled Orders 1958	Unfilled Orders 1957
Jan.	108	148	318	537
Feb.	93	135	288	533
Mar.	92	146	266	517
Apr.	83	139	242	497
May	78	135	240	479
June	87	128	242	445
July	67	104	257	431
Aug.	79	115	270	417
Sept.	...	117	...	397
Oct.	...	126	...	401
Nov.	...	105	...	365
Dec.	...	99	...	343

U. S. Bureau of the Census. Data based on reports from commercial and captive forge shops with monthly shipments of 50 tons or more.



	1958	1957	1956
Jan.	265,489	276,738	302,203
Feb.	225,631	300,887	286,386
Mar.	291,418	312,746	395,686
Apr.	247,293	281,627	352,873
May	218,766	231,246	326,008
June	253,127	207,286	248,326
July	263,778	218,276	259,774
Aug.	280,226	241,218	276,932
Sept.	...	302,869	320,278
Oct.	...	328,655	371,998
Nov.	...	251,123	300,381
Dec.	...	237,501	281,025
Totals	...	3,190,172	3,721,870

Vacuum Cleaner Mfrs.' Assn.

is indicated, but during November, the index will show its biggest gain since the recovery started in May. By the end of the year, the 1958 high point of 144 should be established.

From that point, the climb to the all-time high of 147 (December, 1956) will be much slower. It should be reached about mid-1959 as the result of improved demand for consumer goods and a strengthening of the capital goods industries.

GNP Headed for Record

The Commerce Department says gross national product advanced to an annual rate of $440 billion during the third quarter and is likely to go over the $450 billion mark during the fourth quarter, a new high. The previous record was made during the year-ago period when the annual rate reached $445.6 billion.

The department's Business Advisory Council is said to be figuring on an annual rate of around $480 billion by mid-1959. One of the biggest factors will be a complete switch from inventory liquidation to inventory buildup in anticipation of higher production needs in 1959.

Profit Picture Brightens

Industry profits started to improve during the second quarter, Commerce officials report. Corporate earnings totaled about $32 billion (annual rate), up from $31.7 billion in the first quarter. Figures are not in for the third quarter, but watch for an even better gain.

Failures Hit Two-Year Low

September was the fifth consecutive month in which business failures showed a month-to-month decline, reports Dun & Bradstreet Inc. The 1039 total was the lowest since 1956 and was slightly below the monthly average for that year. The seasonally adjusted annual rate of 53 failures for each 10,000 listed companies in the D&B register was the lowest of the year.

On a year-to-year basis, manufacturing was the only group to show an increase—the casualty rate for machinery and metals companies rose.

Liabilities dropped to a nine-month low of $48 million, but they were still above the year-ago level because of a continued increase in failures of companies with liabilities of $1 million or more.

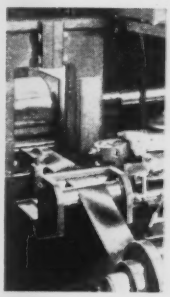
IT'S NOT "HOW THIN"

→ 0/8

BUT HOW EXACT!

With the recent trend in strip metal towards thinner and thinner gauges, Somers, a pioneer in thin strip for nearly 50 years, is naturally among the leaders in rolling *ultra-thin* strip. But in addition to rolling production quantities of strip as thin as can be obtained anywhere in the world, Somers utilizes exclusive techniques and equipment to make sure that every foot of metal is up to the most exacting standards.

1. Accu-Ray nuclear gauging to assure absolute uniformity of thickness throughout.



2. Unique rolling mill for strip from .001" down, makes possible extremely close control of the final pre-anneal temper, and uniform accuracy of the final temper.

NEARLY FIFTY YEARS

3. Experience exclusively with thin strip metals gives Somers an unmatched background in engineering *ultra-thin* strip to meet all special requirements.

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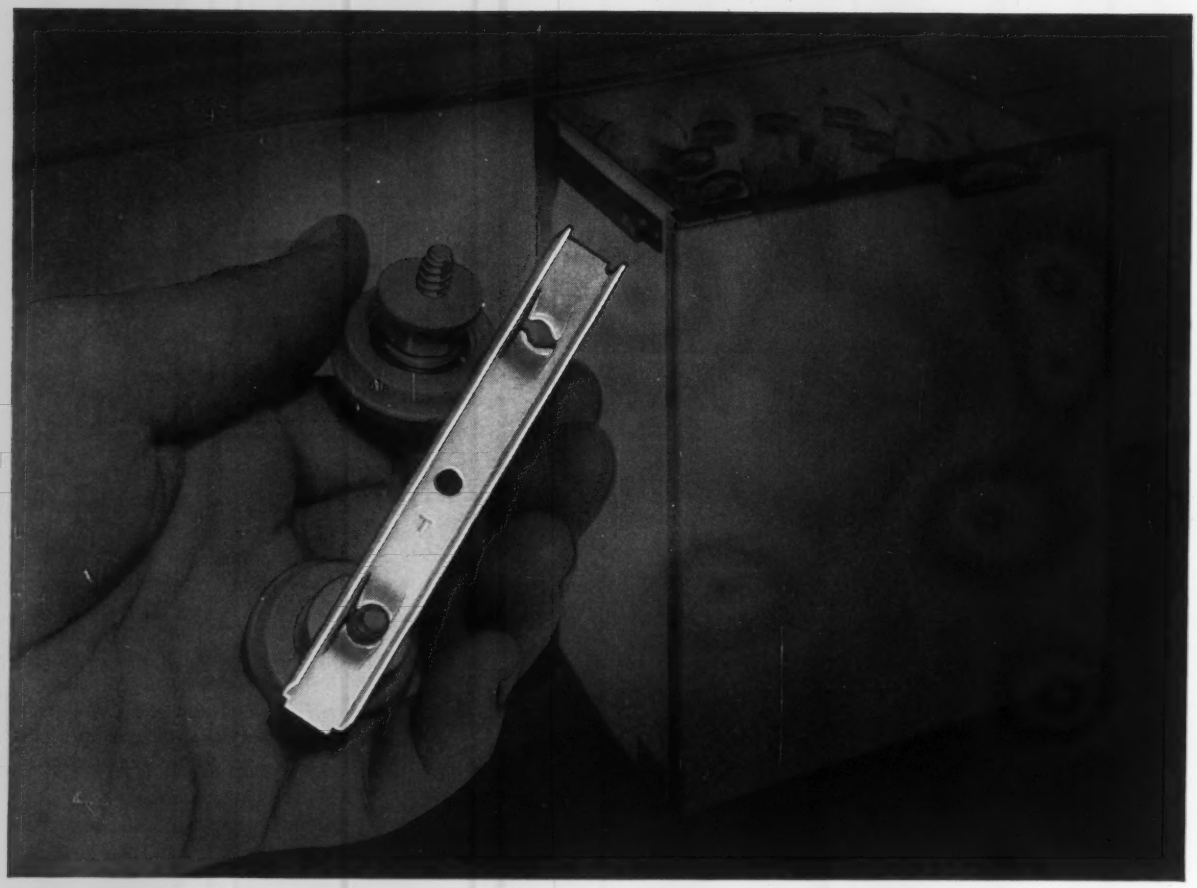

Engineered by Tinnerman . . .

Savings pyramided 68% by a switch to TINNERMAN SPEED NUTS®

First, the saving in material on the General Electric Dishwasher . . . a Tinnerman SPEED NUT brand fastener is formed right in a channel stamped from high-carbon spring steel. This replaces a costly solid steel bar formerly used to mount the pull-out basket rollers.

Next, the Tinnerman SPEED NUT impressions are stamped right in the channel; expensive boring and tapping of the bar stock are eliminated.

Third, sheet metal screws hold tight in the SPEED NUT, and are easier to start and drive than the machine screws formerly used.

General Electric's dishwasher production goes faster and assembly costs are reduced by the easy-to-apply feature of the simplified SPEED NUT part. The difference in weight even makes an important reduction in freight costs on each carload shipment of dishwashers.

What Tinnerman SPEED NUTS accomplished for General Electric can probably be done for you.

A call to your Tinnerman Sales Representative will be the start. He's in the Yellow Pages under "Fasteners".

Or write to:

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Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®

FASTEST THING IN FASTENINGS®

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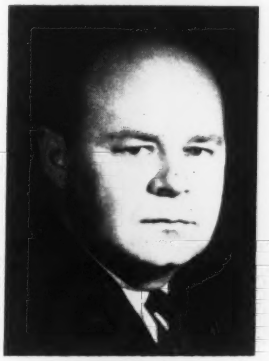


C. W. KING
Farquhar conveyor sales mgr.

JAMES L. DANIELL
joins Jessop Steel

HERCHEL M. RICHEY
Timken div. v. p.-mfg.

DAVID J. ENOCHS
Armco raw materials post

C. W. **King** was made sales manager, conveyor department, **A. B. Farquhar Div.**, York, Pa., Oliver Corp. He succeeds **R. F. Tomlinson**, retired. Mr. King was manager of the Oliver-Farquhar factory branch in Chicago.

James L. Daniell joined **Jessop Steel Co.** of Washington, Pa., as executive assistant to the president. He formerly was vice president and general manager, Alloy Mfg. Co. Inc., Pittsburgh.

W. G. Dahl, former general sales manager, was appointed vice president-sales, **Latrobe Steel Co.**, Latrobe, Pa. **Howard M. Givens**, former vice president-sales, has by his request returned to the company's Miami, Fla., office as southern regional sales manager.

Leon F. Corp, plant manager, Saginaw Malleable Iron plant, **Central Foundry Div.**, General Motors Corp., was promoted to assistant divisional manufacturing manager, a new post. He is succeeded by **Arthur J. Karam**, former production manager at the Saginaw, Mich., plant. Mr. Corp will assist in supervising manufacturing in three plants of Central Foundry Div.

Harold Browning joined **Bay City Foundry Co.**, Bay City, Mich., as general superintendent. He was with Baker Perkins Inc.

Ted W. Karchner was made assistant purchasing agent, **Armco Div.**, Armco Steel Corp., Middletown, Ohio.

Herchel M. Richey was elected vice president - manufacturing, **Roller Bearing and Rock Bit Divisions**, Timken Roller Bearing Co., Canton, Ohio. He assumes the vice presidency Nov. 1, replacing **A. M. Donze**, retired. Mr. Richey was general factory manager.

William R. Bond, former vice president-operations, was elected president of **Woodward Iron Co.**, Birmingham. He succeeds **John E. Urquhart**, now chairman and chief executive officer. **John W. Hager** was made vice president-mining operations.

J. R. McRoberts was named director of sales and marketing for **Omaha Machinery Corp.**, San Diego, Calif.

Charles E. Hunter, former general manager of Hunter-Bristol Corp., was made special assistant to the president of **Thiokol Chemical Corp.**, Trenton, N. J.

D. L. Sperry was elected a vice president of **Baker-Perkins Inc.** With office in Chicago, he heads sales for ten midwestern states. He was with Petersen Oven Co.

Carl Moss was named sales manager of extrusion sales division, **Textron Metals Co.**, Girard, Ohio. He succeeds **George Green**, recently made head of customer relations sales and service.

Charles S. Anderson, president of **Belle City Malleable Iron Co.**, Racine, Wis., was elected to the added post of chairman. He succeeds the late **Judson F. Stone**.

David J. Enochs was placed in charge of company-wide raw materials engineering for **Armco Steel Corp.**, Middletown, Ohio.

Saco-Lowell Shops, Boston, appointed **Henry A. Jewell** director of procurement and material; **Albert F. Koepcke**, director of industrial and public relations and advertising. Both are newly created posts. Mr. Jewell was director of purchases, Long Mfg. Div., Borg-Warner Corp. Mr. Koepcke was at Borg-Warner's central office in Chicago.

Paul J. Rocchio was elected vice president-manufacturing, **Solar Aircraft Co.**, San Diego, Calif.

Edward C. Lindsay was appointed vice president-manufacturing, **Hufford Corp.**, division of Siegler Corp., Los Angeles.

Edward Bachorik was appointed general sales manager, **Allied Control Co. Inc.**, New York. He was regional sales manager.

William J. Stewart was elected president, **Cleveland Punch & Shear Works Co.**, Cleveland. For the last 18 months, he has been vice president and general manager.

Gerald F. Delaney was appointed to **Tranter Mfg. Inc.'s** Platecoil Div., Lansing, Mich. He will concentrate on application engineering and pricing.

William R. Seigle was named manager of manufacturing engineering of the Westover, N. Y., plant of **General Electric Co.** He succeeds

A. H. BLYTH
Ceco metal lath mgr.

HENRY G. HAYNES
Ames Co. president

LAWRENCE E. NELSON
Chrysler-Marine & Indus. post

DR. H. NATHAN STONE
Bay State Abrasive post

Jack M. Waldron, transferred to a GE installation in Everett, Mass.

Ceco Steel Products Corp. named **A. H. Blyth** manager of its metal lath department, Chicago. He was sales promotion manager for Ceco's merchant trade division.

Henry G. Haynes was named president of **B. C. Ames Co.**, Waltham, Mass., to succeed the late **Warren Ames.** He has been treasurer for more than 12 years. **Bliss C. Ames** and **Warren Ames Jr.** were elected vice presidents; **Henry G. Haynes Jr.**, treasurer.

C. H. Rahenkamp Jr. was made representative in charge of the new Pittsburgh sales office of **Trumbull Bronze Co.**

James E. Partlow was made assistant general sales manager, **General Refractories Co.**, Philadelphia. He will co-ordinate activities of the following managers, newly appointed: **W. H. Boyd,** specialties; **G. L. Peck,** rock products; **W. F. Rappold,** nonferrous; **R. G. Abbey,** glass and chemical sales.

Russell Jacobson was elected president, **Tri-Alpha Engineering Co.**, South Gate, Calif., division of Derrold Industries Inc.

Ralph Del Monico was named chief engineer at **Bresdon Steel Co.**, La Jolla, Calif.

Walter T. McCoy Jr. succeeds **Eugene Bordinat,** retired, as New York industrial sales manager for **R. C. Mahon Co.**

John E. McGrath was made Denver district sales manager for **American Steel & Wire Div.**, U. S. Steel Corp.

Lawrence E. Nelson was named vice president-sales of **Chrysler Corp.**'s Marine & Industrial Engine Div. at Detroit. He was director-vehicle sales for Chrysler Motors Corp. **C. C. Williams** was appointed divisional vice president.

K. Herron was appointed Cleveland district sales manager, **Alloys & Chemical Mfg. Co. Inc.**

Harold A. Weiss was named chief tool engineer, **Warner Electric Brake & Clutch Co.**, Beloit, Wis. He was chief engineer, C. W. Smith Engineering Co., Detroit.

Alvin G. Heckman was elected to the new post of vice president-administration, **Babcock Radio Engineering Inc.**, Costa Mesa, Calif.

Richard T. Rosander was made manager of sales engineering for **Chromalloy Corp.**, White Plains, N. Y. He succeeds **D. E. Lehane,** made director of customer relations.

Elmer M. Richardson was made eastern regional manager, **Union Chain & Mfg. Co.**, Sandusky, Ohio. He is in New York.

Ardmore M. Willer was appointed sales manager, **West Instrument Corp.**, Chicago. He was assistant sales manager.

Phil Cooper was made general manager, **Babcock Models Inc.**, Costa Mesa, Calif. He was sales manager.

Paul C. Sternberg was elected president of **Elkay Mfg. Co.**, Chicago. **W. M. Voight** was elected executive vice president; **Fred W. Rexford,** vice president-sales.

Dr. H. Nathan Stone was appointed director of research and development, **Bay State Abrasive Products Co.**, Westboro, Mass. He replaces **Albert L. Ball,** retired, but who continues as technical consultant.

Frederick V. Dexter Jr. was made manager of a new Dayton, Ohio, office of **Sundstrand Turbo Div.**, Sundstrand Machine Tool Co.

John Benjamin was named plant manager, **Seaman-Andwall Corp.**, Milwaukee. He was superintendent of the J. I. Case Co. plant in Bettendorf, Iowa.

Charles D. Bobbitt was made sales promotion manager of the Trojan tractor shovel line manufactured by **Yale & Towne Mfg. Co.**, Batavia, N. Y.

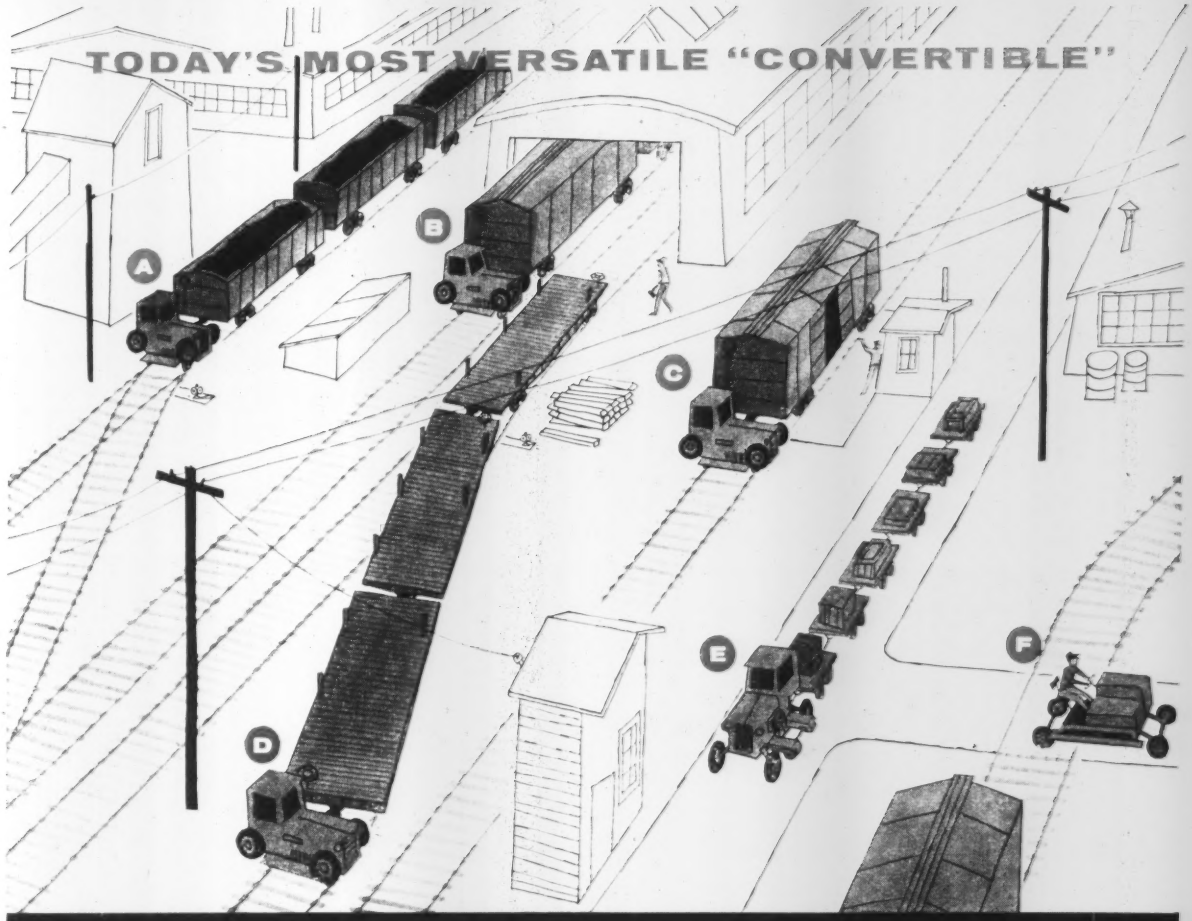
Robert J. Roberts was appointed assistant to the general superintendent, **Weirton Steel Co.**, division of National Steel Corp., Weirton, W. Va.

R. H. Merriman was named manager of **Air Reduction Co.**'s Buffalo district. He succeeds **H. J. Schlieder. F. C. Millspaugh Jr.** succeeds Mr. Merriman as assistant manager-sales, Jersey City, N. J.

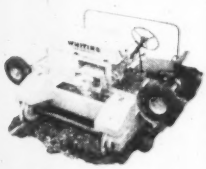
Don B. Hooser was appointed southern district manager, **Cleveland Tramrail Div.**, Cleveland Crane & Engineering Co., Wickliffe, Ohio. He succeeds **William P. Hanks,** now midwestern district manager.

Marvin H. Luedke was named vice president-sales, **American Welding & Engineering Co.**, Milwaukee. He

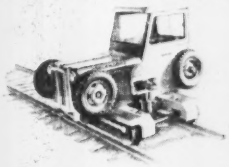
TODAY'S MOST VERSATILE "CONVERTIBLE"



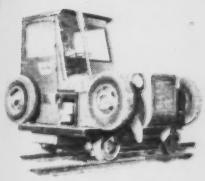
3 Models to Meet Your Specific Needs



2TM Trackmobile



3TM Trackmobile



5TM Trackmobile

All three models of the Whiting Trackmobile switch, spot and haul freight cars fast and at low cost. Trackmobile converts from road to rail in seconds to facilitate car handling, makes your operation more profitable. Here are just a few of the many ways you might use "Today's Most Versatile Convertible":

- **A** New 5TM torque converter Trackmobile quickly switches fully-loaded coal cars.
- **B** Railroads are big Trackmobile boosters—use them to shuttle cars in and out of repair shop.
- **C** 3TM Trackmobile is on the job rain or shine. Here it spots a freight car with pin-point precision.
- **D** 3TM Trackmobile returns empties or loaded cars to siding, positions cars where they're needed, frees plant from dependence on switch engines.
- **E** No freight cars to move at the moment, so 5TM converts to road wheels to haul carts.
- **F** Trackmobile can travel "cross-country" on rubber tires to where it's needed. Now this 2TM will convert to steel rail wheels in seconds.

SEND FOR TRACKMOBILE FACT FILE—Illustrated folders on all three Trackmobile models. See which one meets your needs best. Whiting Corporation, 15643 Lathrop Avenue, Harvey, Illinois.

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS

WHITING

TRACKMOBILE

MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD, AND CHEMICAL PROCESSING EQUIPMENT

PHILIP W. SCOTT
group vice president of Budd

D. B. WIESELY
Continental's metal div. post

GEORGE GUMAS
CDC v. p.-engineering

SELDON T. WILLIAMS
Scovill Mfg. president

GARVIN A. DREW
Schrader Div. gen. mgr.

GEORGE R. SULLIVAN
Green Fire Brick v. p.

was vice president-sales, Milwaukee Boiler Mfg. Co.

Seldon T. Williams succeeds **William M. Goss,** retired, as president and general manager, **Scovill Mfg. Co. Inc.,** Waterbury, Conn. He was general manager, **Schrader Div.,** Brooklyn, N. Y. **Garvin A. Drew,** former general sales manager, was named general manager of **Schrader. Russell C. Flood,** Schrader's operations manager, was elected a vice president of Scovill.

The warehouse division of **Jones & Laughlin Steel Corp.** appointed **Gale B. Highland** product manager-aluminum and stainless steel for the Cincinnati warehouse; **Robert W. Foster,** product manager-aluminum products, Chicago district warehouse.

John J. Gillis was made sales representative for New England by **Anti-Corrosive Metal Products Co. Inc.,** with offices in Boston. He was sales manager, Worcester district, American Steel & Wire Div., U. S. Steel Corp.

George R. Sullivan was elected vice president, **A. P. Green Fire Brick Co.,** Mexico, Mo. He was reappointed director of industrial relations.

Royden Walters was made executive assistant to the president of **Saco-Lowell Shops,** Boston.

H. Kermit Fish was made electrical superintendent; **A. W. Jurvic,** assistant electrical superintendent, **Weirton Steel Co.,** Weirton, W. Va., division of National Steel Corp.

Fred W. Ellis was appointed foundry sales representative to the Dayton, Ohio, area for **Climax Molybdenum Co.,** division of American Metal Climax Inc. He succeeds the late **H. Geitmann.**

Ernest A. Goetz was appointed technical assistant to the president of **American Bosch Arma Corp.,** Hempstead, N. Y. In addition, he remains as chief engineer of Arma Div.

Philip W. Scott was elected a group vice president of **Budd Co.,** Philadelphia, with supervision over four divisions. He was administrative vice president, Byron Jackson Div., Borg-Warner Corp.

D. B. Wiesley was appointed director of staff, metal division, **Continental Can Co.,** New York. He was general manager of production engineering.

George Gumas was elected vice president-engineering at **CDC Control Services Inc.,** Hatboro, Pa.

Irving Whitehouse was appointed assistant director of research, **Republic Steel Corp.,** Cleveland. He will direct the new research center in Independence, Ohio.

John J. Sheehan was appointed general manager, International Div., **Hewitt-Robins Inc.,** Stamford, Conn. He succeeds **Harold von Thaden,** retired.

OBITUARIES...

Russell M. Fellows, 66, chairman and treasurer, **Fellows Gear Shaper** Co., Springfield, Vt., died Oct. 13.

Robert W. Nelson, 48, vice president, **American Air Filter Co. Inc.,** Louisville, died Oct. 9.

David C. Griggs, 87, former president and chairman, **Waterbury Farrel Foundry & Machine Co.,** Waterbury, Conn., died Oct. 9.

Paul B. Pew, 60, executive vice president, **Linde Co.,** a division of Union Carbide Corp., New York, died recently.

George P. Pendergast, 49, acting purchasing agent, **National Carbon Co.,** Niagara Falls, N. Y., died Oct. 13.

James S. Freese, 54, general production manager, **Timken Roller Bearing Co.,** Canton, Ohio, died Oct. 13.

A. P. Woodson, 77, chairman, **Marathon Electric Mfg. Corp.,** Wausau, Wis., died Oct. 8.

Edward B. Mullen, 54, assistant sales manager in St. Louis for **United States Steel Corp.,** died Oct. 13.

Why do dies need less maintenance in the Wean "Flying Press"?

Before answering the question, perhaps we'd better establish the fact: firms which have conducted comparative die life tests report that significant savings have been achieved with the "Flying Press." One company reported a 36% monthly reduction in die maintenance costs, noting that part production between die grinds on one run was increased from 4,000 to 123,000 pieces. Another "Flying Press" user reported that dies which had previously required repair every three weeks in a conventional press ran for a year with only one grind in the "Flying Press" . . . and turned out over 1 million parts!

The answer to this cost-cutting aspect of "Flying Press" operation lies in its unique design. Since the dies are in motion in the "Flying Press," they operate at a lower temperature than in conventional presses. Another factor is the higher punching velocity inherent in the "Flying Press" design, with its 600 strokes per minute top speed. Other "Flying Press" features . . . such as its lower bed suspension system which minimizes side thrust on the gibs, and its dynamic balance . . . also contribute to longer die life and sustained accuracy of press adjustment.

Finally, dies are protected against damage by the protective devices built into the "Flying Press" to detect "cobbles" and prevent double hits. And the "Flying Press" uses standard dies, so there's no special expense involved in its tooling.

Operating economy is just one more reason that you should investigate this outstanding piece of metalworking equipment if your plant uses stamped parts in quantity. We'll be happy to send you literature or arrange an appointment for a Wean sales representative to discuss the potential of the "Flying Press" for your specific production operations. May we hear from you?

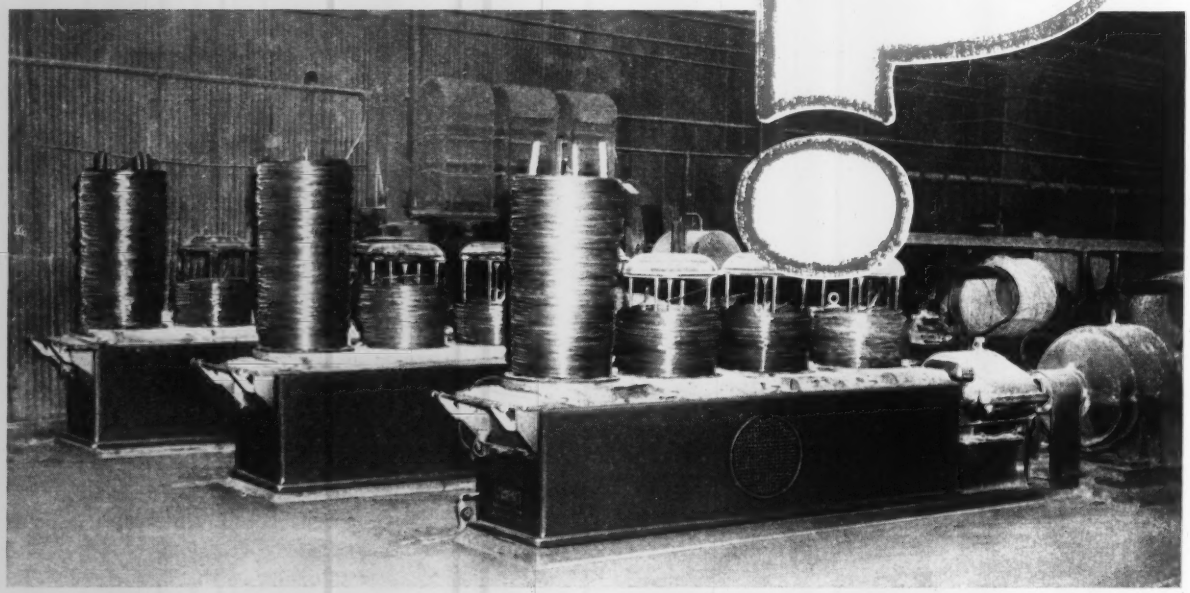
WEAN

WEAN EQUIPMENT CORPORATION

CLEVELAND 17, OHIO

Detroit • Chicago • Newark

want **BIG** *bundle capacity*



. . . then try **MORGAN-CONNOR** wire machines. The Morgan-Connor Machine is a nonslip, continuous, dry wire drawing machine. Morgan machines will give you maximum weight bundles at the lowest possible cost.

MORGAN WORCESTER

MORGAN-CONNOR
WIRE MACHINES

WM 110

MORGAN CONSTRUCTION COMPANY WORCESTER, MASS.

ROLLING MILLS • MORGOIL BEARINGS • WIRE MILLS • REGENERATIVE FURNACE CONTROL • EJECTORS • GAS PRODUCERS

S. S. Rickley, Representative, 300 Cedar Blvd., Pittsburgh, Pennsylvania

Armco Opens Mill

New heat treating facilities at Houston provide nearby source of special steels for area plants

HIGH STRENGTH, heat treated alloy steels are being processed at the Houston mill of Sheffield Steel Div., Armco Steel Corp. The new facilities represent a significant step in southwestern industrial development.

Special alloy steels are used by numerous industries in the area, including those making oil field goods and equipment, and aircraft. Formerly, southwestern manufacturers had to buy their alloy steel from distant eastern mills, says W. S. Newell, vice president in charge of Sheffield Steel Div. sales.

• **Processing Steps**—The heat treating line is 500 ft long. Steel destined for heat treatment is produced in electric or open hearth furnaces and processed into bars and plates. Each unit of alloy steel is heated uniformly to the working temperature required for the special use for which it is intended. It is quenched in oil or water and cooled under close controls.

The steel is then fed directly into a tempering furnace and drawn to the desired degree of hardness. It is given further heat treatment if needed to normalize it. Finally, the steel is either air cooled or furnace cooled to produce a wide range of properties in the finished product.

Bars and plates which must be annealed, such as those required by the aircraft industry, are treated in a special furnace which is instrumented to assure close control of atmosphere, time, and temperature necessary to produce uniform structure in the finished steel.

Harvey Casting Titanium

Titanium castings have been added to the line of products made by Harvey Aluminum at its Torrance, Calif., plant. The firm uses a closed consumable electrode furnace in which a high vacuum or inert gas atmosphere is maintained to protect the metal from oxygen or nitrogen.

Additional equipment for the production of aluminum rolled ring forgings also has been installed to meet increased requirements of missile producers. Other uses include food machinery, compressors, and ordnace components.

Seymour Installs Mill

Seymour Mfg. Co., Seymour, Conn., is installing a Mesta 4-high rolling mill which will allow greater utilization of its Sendzimir reversing mill. The equipment will facilitate expansion of the firm's line of products and will greatly increase over-all production capacity.

Join in Defensework

Vitro Corp. of America, New York, and Koppers Co. Inc., Pittsburgh, have signed a "joint venture" agreement. It enables Vitro Laboratories, Silver Spring, Md., and Koppers' Metal Products Div., Baltimore, to undertake weapon systems work for the Department of Defense. The work will cover research and development through large scale manufacture.

Foundry To Hike Output

Chevrolet Motor Div.'s new aluminum foundry at Massena, N. Y., is scheduled to begin volume production of castings next June.

Broadens Pump Line

Deming Co., Salem, Ohio, purchased the rotary pump business of the Seren Machine Products Co., Chicago. The purchase included Seren's rotary pump inventory, tools, fixtures, and test equipment which are being moved to Salem.

Shifts Plant Operation

Responsibility for the operation of the Harrisburg, Pa., plant of United States Steel Homes Div., U. S. Steel Corp., will be transferred to the American Bridge Div. The plant will continue to produce steel housing components, serving the requirements of U. S. Steel Homes plant at New Albany, Ind. The increasing volume of steel panels for American Bridge modular schools and other commercial requirements of a type handled by American Bridge make this transfer appropriate, say officials of the divisions.

Expands Motor Plant

Sterling Electric Motors Inc., Los Angeles, has expanded its plant at 4610 Smith Rd., Cincinnati 12, Ohio. It is equipped to provide prompt delivery on many motors requiring special windings.

Distributor Expands

Production Steel Co., supplier of steel and aluminum products, is building an addition to its building at 2801 Roosevelt Rd., Broadview, Ill. Processing facilities include equipment to slit, shear, saw, burn, edge, decoil, roller level, and skin roll to customer specifications.

Dahlstrom Changes Hands

A group headed by Bruce Ballman has acquired full control of Dahlstrom Machine Works Inc., Chicago. The firm makes high-speed sheet and strip fabricating equipment and decoiling lines for press feeding or shearing of coil steel stock. Officers are: President and treasurer, Bruce Ballman; vice president and secretary, Rudy Toczyl.

Gets Meehanite License

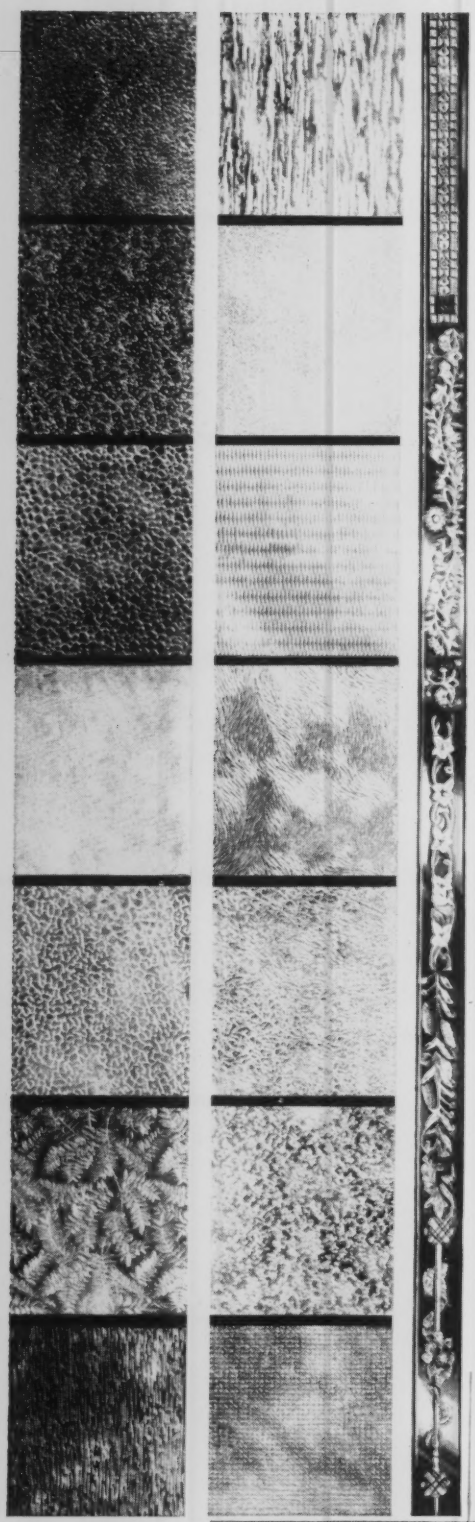
Meehanite Metal Corp., New Rochelle, N. Y., licensed Dayton Casting Co., Dayton, Ohio, to make Meehanite metal castings. The Dayton firm specializes in general engineering castings weighing 50 lb to 26 tons.

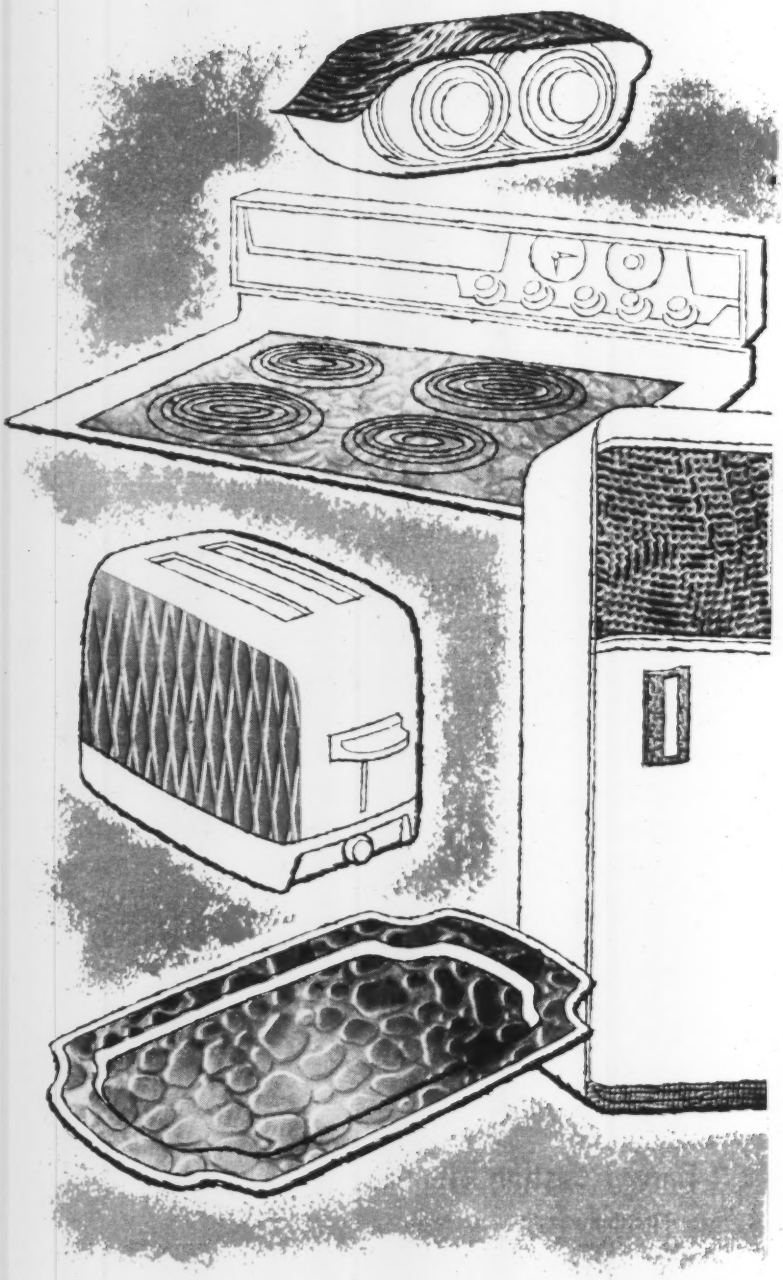
Forms Auto Parts Division

Saco-Lowell Shops, Boston, has formed a separate Automotive & Agricultural Parts Div. J. Arnold Kiely is vice president in charge of the division. Daniel O'Madigan Jr. is general sales manager of the division with headquarters in Detroit. The division operates from the Edwards plant at Saco, Maine, producing such items as universal joints, universal joint flanges, heat exhaust valves, mufflers, rear axle assemblies, gear cases, gears, oil pumps, and axle and steering components. The company also separated its textile machinery manufacturing into three

(*Please turn to Page* 66)

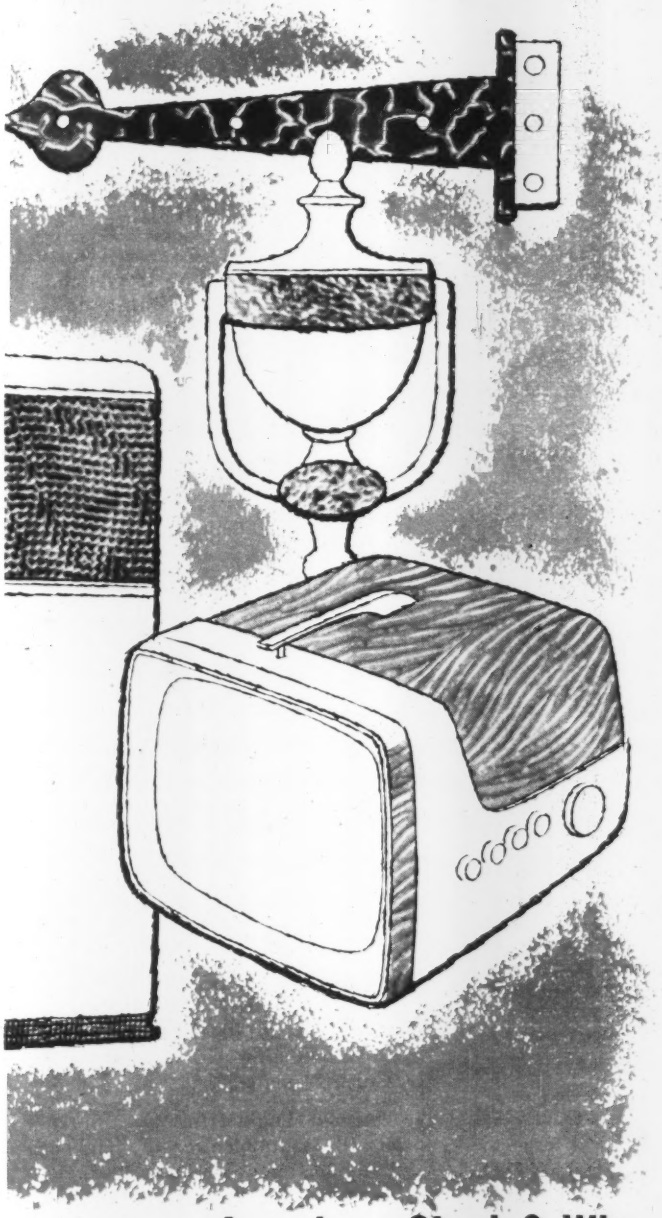
New way to





New patterns . . . Here are 19 new embossed Amerstrip patterns. They can be used on any consumer product made of strip steel, such as: escutcheons, hinges, door knockers, TV and radio cabinets, lamps, table tops, trays, dashboards and kick panels, small appliances, and large appliances.

add beauty and "sell" to consumer products



. . . embossed USS Amerstrip

HERE are just a few examples of the way in which embossed Amerstrip steel can enhance the beauty—and salability—of products made with strip steel. And this is *permanent* beauty . . . beauty you add to your consumer products at low cost.

New embossed Amerstrip is an inexpensive way to add charm and distinction to products because you do not have to apply the pattern; the designs are etched on rolls, then pressed into the strip at our strip mill. Once these patterns are applied, they cannot come off; they are permanently rolled into the steel. A wide variety of new patterns are now at your disposal. Embossed Amerstrip has been experimentally fabricated into products to prove that cold drawing does not affect the pattern. It actually draws easier because the pattern helps hold the lubricant.

Embossed Amerstrip has any number of possible applications, including automobile trim, appliances, hardware, and furniture. New embossed Amerstrip—like all types of Amerstrip—is made to meet the standards of highest quality. American Steel & Wire Division has a large, competent technical staff to help you select the embossed Amerstrip your product needs. Put extra beauty—and customer appeal—in your product with embossed Amerstrip Cold Rolled Strip Steel. For full information, call our nearest sales office. American Steel & Wire, 614 Superior Ave., N. W., Cleveland, Ohio.

USS and Amerstrip are registered trademarks

American Steel & Wire
Division of USS United States Steel

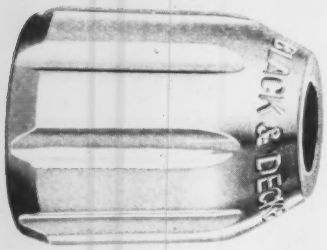
Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors • Tennessee Coal & Iron Division, Fairfield, Ala., Southern Distributors • United States Steel Export Company, Distributors Abroad

now

you can get this brilliant finish directly on zinc die castings!

No electroplating--no mechanical finishing!

PART AS CAST



TREATED WITH NEW IRIDITE

NEW IRIDITE® (Cast-Zinc-Brite)

brightens zinc die castings by chemical polishing, protects against corrosion

NOW, FOR THE FIRST TIME you can get a brilliant, decorative finish directly on zinc die-cast parts . . . without mechanical finishing, without electroplating! The luster is provided by the *chemical polishing* action of new Iridite (Cast-Zinc-Brite) solution. Even surface blemishes, such as cold shuts, are brightened by this new process. No electrolysis. No special equipment. No specially trained personnel. Just a simple chemical dip for a few seconds and the job is done. And, this new Iridite has been *tested and proved* in production.

CORROSION RESISTANCE, TOO! New Iridite (Cast-Zinc-Brite) provides exceptional corrosion resistance for bright-type chromate finishes . . . also guards against blueing or darkening by eliminating zinc plate formerly required in bright chromate finishing of zinc die castings.

AS A BASE FOR ELECTROPLATING—Lower mechanical finishing costs are possible where plated finishes are *required* since the brightness provided by this new Iridite may be sufficient.

LET US SHOW YOU what Iridite (Cast-Zinc-Brite) can do for you. Send us at least a half-dozen typical zinc die-cast parts for FREE PROCESSING for your own tests and evaluation. Or, for immediate information, call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified 'phone book. *IMPORTANT: when you give us samples for test processing, please be sure to identify the alloy used.*

Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET

BALTIMORE 5, MARYLAND

***Manufacturers of* IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals—West Coast Licensee: L. H. Butcher Co.**

(*Concluded from Page 63*)

divisions: Textile Machinery, Replacement Parts, and Gear & Machine.

Enlarges Sintering Plant

Additional sintering facilities will be installed at the ore conditioning and sintering plant of Tennessee Coal & Iron Div., U. S. Steel Corp., at Wenonah, Ala. A new sintering machine will be constructed, and improved auxiliary facilities for the handling and processing of ore will be installed.

Atlas Opens Building

Atlas Steels Ltd. opened its new administration building at Welland, Ont., recently. The three-story structure features stainless steel curtain wall construction.

Enters Metal Scrap Field

Sherwin-Metal Co. has been organized at 2499 Hill Ave., Toledo, Ohio, to process nonferrous scrap. The firm is a dealer in brass, copper, aluminum, lead, and zinc, and available for commercial testing.

Frick Steel Founded

Formation of Frick Steel Co. (1029 McLaughlin Run Road, Bridgeville, Pa.) is announced by George W. Frick. George W. Frick Jr. is secretary-treasurer. The firm warehouses stainless and tool steels.

NEW OFFICES

Chain Belt Co., Milwaukee, opened a district sales office and warehouse at 10488 Chester Rd., Cincinnati, Ohio. Charles C. Pingry is district manager.

Arnold Engineering Co., Marengo, Ill., manufacturer of magnetic materials, opened a sales and engineering office at 20 E. Martin St., Raleigh, N. C. John C. Ray is in charge. The firm is a subsidiary of Allegheny Ludlum Steel Corp., Pittsburgh.

Metals Div., Olin Mathieson Chemical Corp., New York, opened a district sales office at 333 Mont-

WATERBURY FARREL SENDZIMIR MILLS

SENDZIMIR MILLS MEET THE REQUIREMENTS OF MODERN METALS

Precision cold rolling on the Sendzimir cold rolling mill is attaining universal acceptance for rolling metals to the close tolerances required in the construction of supersonic aircraft and missiles.

The mills have also proven their great advantage for many diversified uses in other fabricating fields.

Sendzimir mill construction insures uniformity of thickness, both end to end and across the strip width. Shape adjustments are possible while rolling to insure flatness of the strip. A big factor in lowered production costs is the elimination of intermediate anneals.

Small rolls, because of the smaller bite, are subject to less flattening and consequently can continue to reduce the metal even after the metal has become highly work-hardened and very thin.

Small Work Rolls Minimize Down-time

Prominent in the cost saving features of the highly flexible Sendzimir mills are the advantages of quick change work rolls. All finish thicknesses within a mill's capacity can be produced in one day or in one shift with only minor adjustments. When changing from one finish thickness to another production delays are insignificant.

Maintain Precision At High Production Speeds

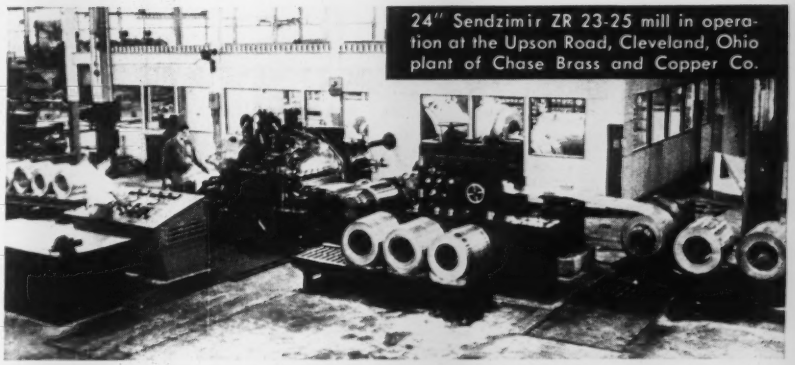
Throughout the Metalworking industry, ferrous and non-ferrous metal is being

Tadeusz Sendzimir, V. P. of The Waterbury Farrel Foundry & Machine Co.

DIVISION OF TEXTRON INC.

rolled in Sendzimir mills where rigid tolerances must be met on a production basis. For example, on lamp base stock, which is subject to deep drawing, gauge variations cause high scrap losses and shorten die life. On Sendzimir mills, at a finish gauge of .008", accuracy is maintained regularly within .0002" along the length of the strip. It has no heavy center, being within .0001" across the entire width.

Let us help you apply our experience in Sendzimir rolling methods to your ferrous or non-ferrous rolling problems. Our engineering staff is always at your service to assist in determining the right kind of mill for your needs. Just write or phone The Waterbury Farrel Foundry & Machine Co., Rolling Mill Division for further information.

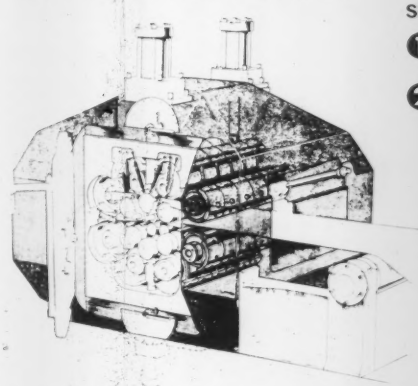


24" Sendzimir ZR 23-25 mill in operation at the Upson Road, Cleveland, Ohio plant of Chase Brass and Copper Co.

WATERBURY FARREL SENDZIMIR MILLS WIDELY USED FOR QUALITY NON-FERROUS PRODUCTION

In rolling non-ferrous metals, the Sendzimir mill has achieved prominence throughout the industry. Nearly every brass and copper producer in the U.S.A. and many European countries has such a mill. Rolling metal to ultra thin gauges and to extremely close tolerances, brass and copper producers with Sendzimir mill installations have expanded their production facilities and are producing metals with quality aspects that are difficult, if not impossible, to duplicate. With the installation of a 24" mill at the Upson Road Plant of The Chase Brass and Copper Co., Inc., in Cleveland, a top speed of 1000 feet per minute was obtained.

Do You Cold Roll?

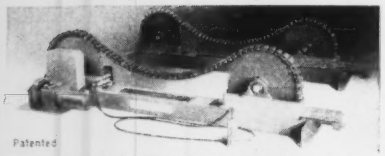


Then look at these Sendzimir mill advantages

1. Practically no limitation as to width of strip.
2. Rigid backing gives the mill extra ability to maintain close tolerances — an advantage on both ferrous and non-ferrous strip.
3. Elimination of intermediate anneals—also saves handling, reduces inventory and provides better surface finish.
4. Compact mill design requires less floor space.
5. Small working parts make maintenance quick and easy, work rolls can be changed in less than a minute.
6. The small work rolls eliminate need for heavy duty cranes and expensive grinding equipment.
7. Investment compares favorably with competitive equipment.

THE WATERBURY FARREL FOUNDRY & MACHINE CO.
DIVISION OF TEXTRON INC.
WATERBURY, CONNECTICUT, U. S. A.
SALES OFFICES: Chicago • Cleveland • Los Angeles • Millburn, N. J.

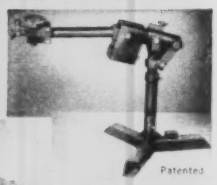
ARONSON
Offers You Over 200 PROVEN Standard Stock Models of Quality POSITIONERS "POSITIONEERED" to your exact Requirements



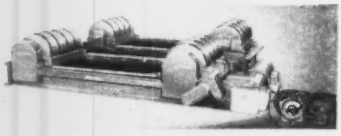
Patented

Aronson TrecTred (T. M. Reg.) Turning Rolls for thin walled heavy cylindrical work to 27 tons capacity. Zero to 100 IPM turning speed and Built-In Grounding.

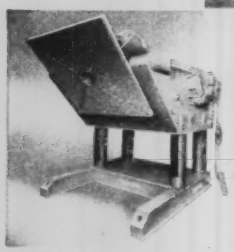
Aronson Universal Balance Positioners (T. M. Reg.) position your weldments effectively, instantly for downhand welding. Capacities to 2000 lbs.



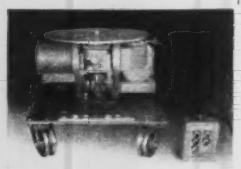
Patented



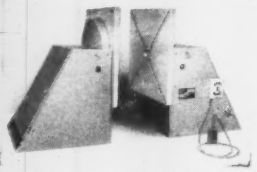
Heavy Duty Precision Built Rubber and Steel Tired Turning and Pipe Rolls. 100% overland protected. Capacities to 600 Tons.



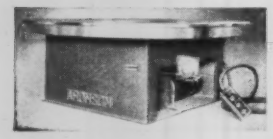
Fully Automatic Gear Driven Positioners, featuring Geared Elevation, 135° Tilting and Variable or Constant Speed Rotation. Capacities to 350,000 lbs.



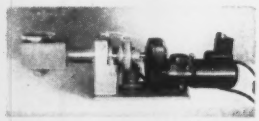
Model D Gear Driven Positioners. Compact, Precise, Rugged. Capacities to 1000 lbs.



Rugged Head and Tail Stock for positioning bulky weldments between centers. Table "Backup for Zero Deflection. Magnetic Braking. Capacities to 360,000 lbs. Geared Elevation Optional.



Heavy Duty Floor Turntables with precision speed control and Magnetic Braking, used for welding, burning, X-raying, etc. Capacities to 120,000 lbs., various heights and speeds.



Bench Turntable Automatic Positioners with Mercury Grounding. Capacities to 500 lbs.

Quality POSITIONERS by *Aronson* MACHINE COMPANY
ARCADE, NEW YORK

CANFIELD PRODUCES *LIFEKOTE* PRE-PAINTED AND ELECTRO-GALVANIZED STEEL

FOR ITS OWN FABRICATING NEEDS AND FOR YOURS

Whether you are merely after information on the fabrication of pre-painted and electro-galvanized steel, or are looking for a reliable source for these products—Canfield offers every advantage. Canfield is one of three divisions within Life Time Products Corporation, and produces pre-coated steels for further fabrication within the corporation. This experience in the use of their own steels guides every consultation with prospective users. Too, Canfield assures you the same uniform properties and quality it is required to furnish within its own corporate establishment. Capacity to .060x48" wide. Why not consult with a Canfield representative? No obligation, of course.

ANOTHER CANFIELD SERVICE: SLITTING, ELECTRO-GALVANIZING AND ENAMELING CUSTOMERS' STEEL

CANFIELD STEEL COMPANY
DIVISION OF LIFE TIME PRODUCTS CORP.
CANFIELD, OHIO

gomery St., San Francisco, Calif. Paul T. Persons is district manager.

CONSOLIDATIONS

Kennecott Copper Corp., New York, and **Okonite Co.**, Passaic, N. J., will merge, subject to approval of Okonite stockholders. The consolidation will bring together a major producer of copper and a large maker of cables.

American Meter Co., Philadelphia, purchased **Buffalo Meter Co.**, Buffalo. W. G. Hamilton Jr. is president of both firms.

Johns-Manville Corp., New York, purchased the **Corrulux Div.**, L-O-F Glass Fibers Co., Houston. Corrulux makes translucent structural building panels.

NEW PLANTS

Hoover Ball & Bearing Co., moved its Ball & Bearing Div. to a 200,000 sq ft manufacturing and office facility at Ann Arbor, Mich.

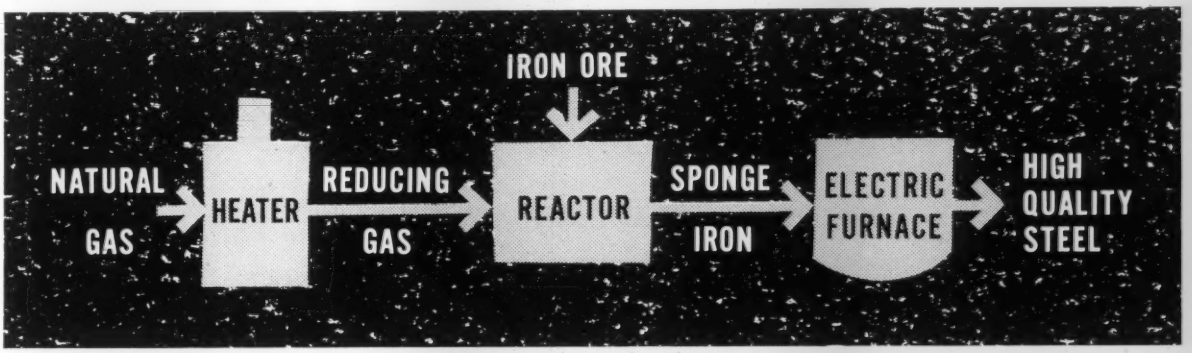
American Chain Div., American Chain & Cable Co. Inc., York, Pa., installed a chain service station at its warehouse at 890 Tennessee St., San Francisco, Calif. Jim Russo is in charge of the operation.

KSM Products Inc., Merchantville, N. J., established a warehouse and sales office at 656 Folsom St., San Francisco, Calif. The firm makes studwelding equipment and accessories. John T. Rayner has been appointed regional sales manager for the Pacific area. The firm also established a sales office at 1238 S. Atlantic Blvd., Los Angeles, Calif., and named F. Leonard Hultquist sales engineer in that city.

Big Boy Mfg. Co., Burbank, Calif., leased a factory at 2415 S. Third St., St. Louis, Mo. The firm is a subsidiary of H&B American Machine Co. and produces home barbecue equipment and accessories.

Union Tank Car Co., Chicago, officially opened its all-steel circular building at Baton Rouge, La. It is

NEW Sponge Iron Process opens new economics– new areas of operation for steel making



A steel industry based on iron ore and natural gas or petroleum is economically and operationally practical using a direct reduction process available through The M. W. Kellogg Company, exclusive world-wide sales and licensing agent. The process yields a sponge iron which can be substituted for the pig iron or scrap charge to electric or other melting furnace.

The success of the sponge iron process has been firmly established in a 30 ton per day pilot plant and a 200 T/D production plant operated by Fierro Esponja S.A., an affiliate of Hojalata y Lamina S.A.—one of Mexico's principal steel producers. Based on the success of the present plant, HyL has awarded Kellogg a contract to engineer and construct a 500 T/D plant incorporating further improvements in thermal efficiency and materials handling.

Reduction of ore to sponge iron occurs in a controlled-atmosphere reactor. Neither coal nor limestone is required. Small, low-investment plants can be designed to meet practically any need and can be constructed at far below the cost of a blast furnace. The process was developed by Hojalata y Lamina—parent company of Fierro Esponja. The problems of economically obtaining a reducing agent from natural gas or petroleum, and of engineering and constructing the 200 T/D plant, were solved by Kellogg on the basis of its extensive experience in furnace engineering and hydrocarbon processing.

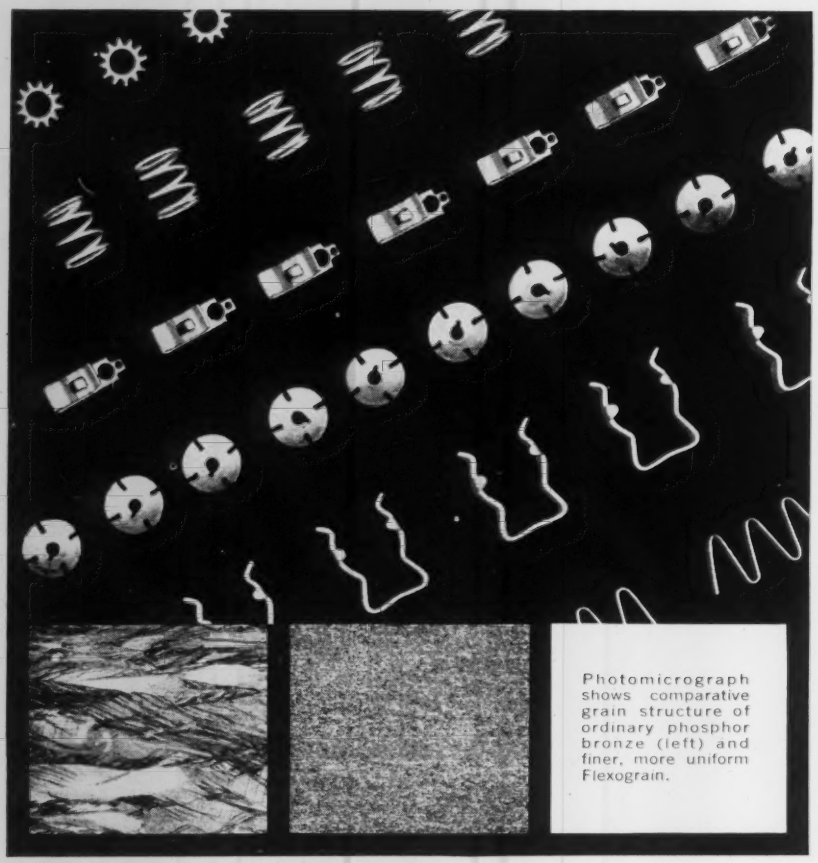
The M. W. Kellogg Company is a world-wide organization which specializes in engineering and constructing plants involving complex chemical processes. This experience qualifies Kellogg to engineer and construct plants using the sponge iron process. For those desiring further information, a booklet explaining the sponge iron process in more detail is available. Arrangements for screening a motion picture showing the sponge iron process in action may also be made by writing The M. W. Kellogg Company.

KELLOGG

THE M. W. KELLOGG COMPANY, 711 THIRD AVENUE, NEW YORK 17, N. Y.

A SUBSIDIARY OF PULLMAN INCORPORATED

The Canadian Kellogg Co., Ltd., Toronto • Kellogg International Corp., London • Kellogg Pan American Corp., New York
Societe Kellogg, Paris • Companhia Kellogg Brasileira, Rio de Janeiro • Compania Kellogg de Venezuela, Caracas


Photomicrograph shows comparative grain structure of ordinary phosphor bronze (left) and finer, more uniform Flexograin.

TESTS PROVE BETTER FATIGUE LIFE with Flexograin phosphor bronze

Only a specialty mill in phosphor bronze could produce a product like Flexograin—a uniform, fine-grain phosphor bronze with substantially better fatigue life. Tests prove that Flexograin withstands stress and strain that would cause failure in ordinary, coarse-grain phosphor bronze. Even after torturous forming operations, Flexograin, with its higher ductility, maintains its smooth, bright surface finish.

Riverside-Alloy technical experts don't just accommodate phosphor bronze inquiries—they *concentrate* on them. Chances are, they can suggest new uses for Flexograin that will save you money. Wire, write, or call for complete details. And for free technical bulletin, T-4, which describes the properties and uses of Flexograin, write today to—*Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, N. J.*

H. K. PORTER COMPANY, INC.
RIVERSIDE-ALLOY METAL DIVISION

a regional tank car repair and maintenance facility. The structure has no internal supports, rises 120 ft, and has an over-all diameter of 384 ft at its base. Area: 110,000 sq ft.

DuBois Co. Inc., Cincinnati, will formally dedicate its plant at East Rutherford, N. J., Nov. 5. The firm produces cleaning compounds.

ASSOCIATIONS

National Association of Sheet Metal Distributors, Philadelphia, elected these officers: President, A. B. Lewis, Palmer-Donavin Mfg. Co., Columbus, Ohio; executive secretary, T. A. Fernley Jr.; and vice presidents, J. J. Worley Jr. of N. B. Handy Co., Lynchburg, Va., and R. W. Mason, McDermid Bros. Ltd., Toronto, Ont.

NEW ADDRESSES

Bettinger Corp. moved to Summer Street, Milford, Mass.

Jamison Steel Corp. (service center for tool, alloy, and special steels; dies and accessories) moved to 13039 S. Main St., Los Angeles 61, Calif.

Harco Corp. moved its headquarters to 4600 E. 71st St., Cleveland 25, Ohio. The firm designs cathodic corrosion protection systems.

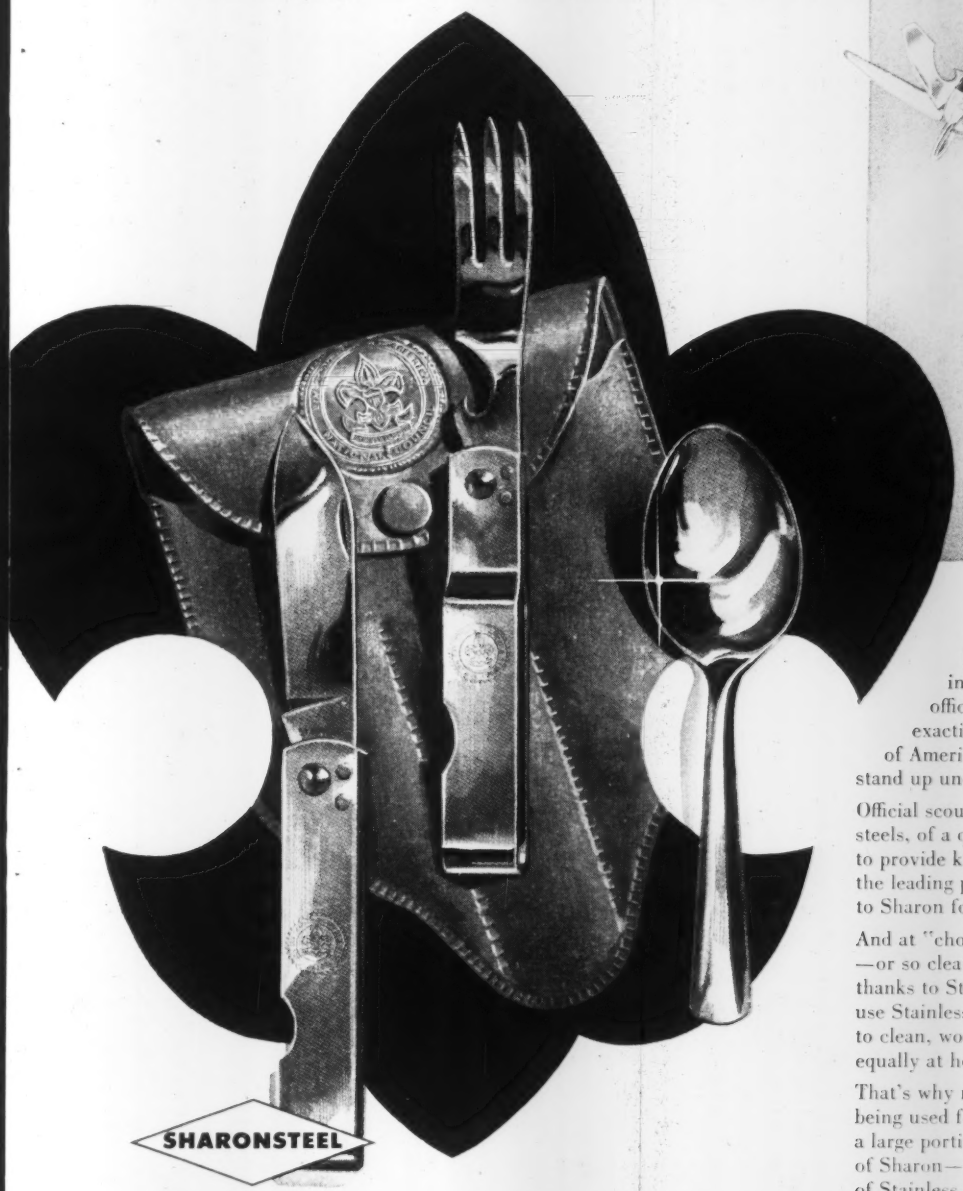
Executive sales office of **Phosphorus Div.** of Hooker Chemical Corp., moved to 60 E. 42nd St., New York 17, N. Y. John B. Sutliffe is general sales manager of the division.

Brown-Brockmeyer Co., Dayton, Ohio, is moving its recently acquired National Gear Works from Indianapolis to Wilmington, Ohio. The company's present Wilmington operation (manufacture of electronic door lifters) will be moved to its Washington Court House, Ohio, plant which has been producing motors.

Templet Industries Inc. (steel-rule-die economy tooling) moved to 701 Atkins Ave., Brooklyn 8, N. Y.

On the trail or in the home
Scouts are always prepared
–with fine cutlery made of

SHARON STAINLESS AND CARBON STEELS



Nearly five million scouts and their leaders enjoy the fun, adventure and inspiration of scouting. Their official equipment, all made to the exacting specifications of the Boy Scouts of America is of the finest—it has to be to stand up under rough, tough service.

Official scout knives are made of fine carbon steels, of a quality and uniformity warranted to provide keen, long lasting edges. That's why the leading producer of official knives looks to Sharon for its steel supplies.

And at "chow time", scouts never had it so good —or so clean! In every climate, the year round, thanks to Stainless Steel, millions of scouts use Stainless Steel eating gear because it is easy to clean, won't rust or white corrode, and it's equally at home indoors or out.

That's why more and more Stainless Steel is being used for scouting and camping equipment— a large portion of which comes from the mills of Sharon—one of the nation's leading producers of Stainless Steels.

THE FINEST CUTLERY IN THE WORLD IS 'MADE IN AMERICA'

SHARON STEEL CORP.

SHARON, PENNSYLVANIA

CHICAGO • CINCINNATI • CLEVELAND • DAYTON • DETROIT • GRAND RAPIDS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE
NEW YORK • PHILADELPHIA • ROCHESTER • SHARON • SEATTLE • SAN FRANCISCO • WASHINGTON, D.C. • TORONTO • MONTREAL

Boosts production of gas oven thermostats 11½% using Gulfcut

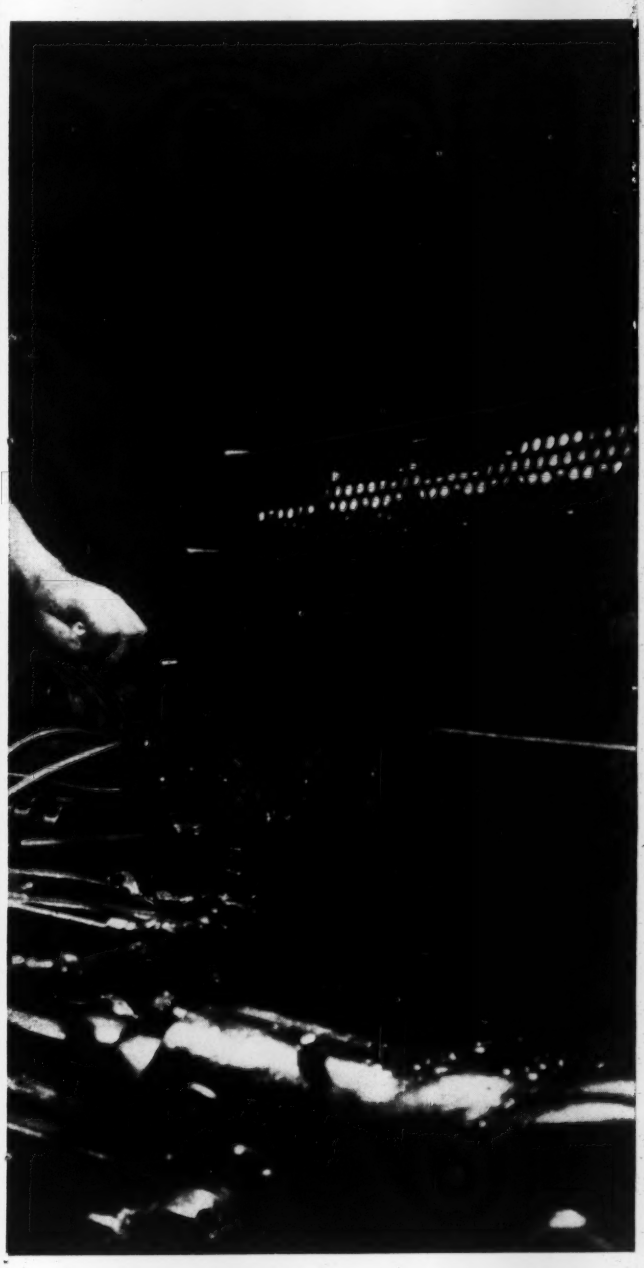
GULF MAKES THINGS

What makes a gas oven thermostat "tick"? The "brain" of the thermostat is a complex valve-control assembly requiring precision machining.

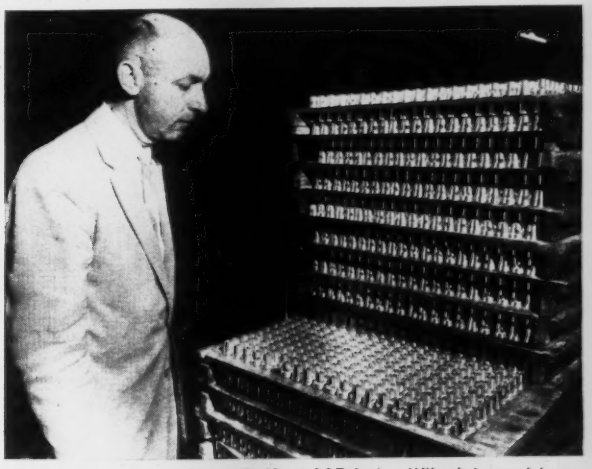
The Wilcolator Company, Elizabeth, New Jersey, turns out thousands of these units a day . . . using Gulfcut 11D Cutting Oil exclusively in the machining of aluminum bodies and plugs for these assemblies.

"We've experimented with a number of different cutting oils on this operation," says Lester C. Stork, Vice President of Manufacturing at Wilcolator. "But only Gulfcut 11D gives us the 20 micro finish we need on certain critical parts. What's more, it helped us increase production by 11½%.

"Better finish and increased production are only part of the story. We like Gulfcut 11D Cutting Oil because it doesn't stain our machines, or contaminate the solvent in our de-greaser. It's safer to work with, too, because of its high flashpoint."



This Heald machine finishes 3 bodies and 3 plugs simultaneously every 19 seconds. Taper cuts are made at 2000 rpm with a feed of .00212. Wilcolator uses Gulfcut 11D cutting oil on this and all other aluminum machining jobs.



Gulf man sees proof that Gulfcut 11D helps Wilcolator get top results in their most critical machining operation. Jacques Schindler, Gulf Sales Representative, notes the perfect finish and the exact fit of the tapered plugs to the bodies.

◀ This 10-spindle Kingsbury automatic drilling and tapping unit machines critical holes in the body of the control valve. Gulfcut 11D was found to be the only cutting oil to give Wilcolator the 20 micro finish required on this surface.

Cutting Oil . . . more proof that

RUN BETTER!

How about your operation? Do you machine nonferrous metals? Non-staining, non-corrosive Gulfcut 11D was developed especially for this use. Try it in your plant. Whatever type of machining you do, there's a shop-tested cutting oil to meet your specific needs in the complete Gulfcut line. See how Gulf makes things run better. Call a Gulf Sales Engineer at your nearest Gulf office, or mail coupon today for illustrated literature on Gulfcut Cutting Oils.

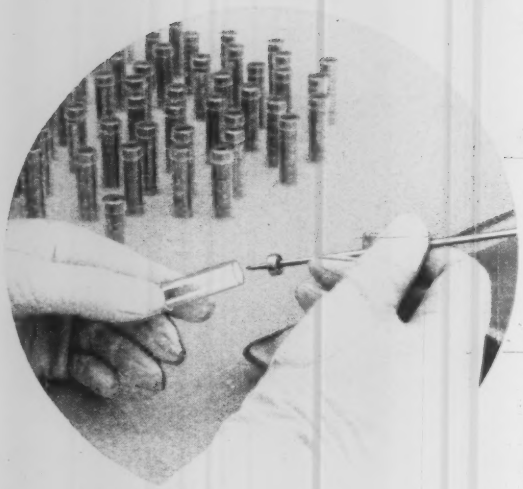
GULF

GULF OIL CORPORATION
Dept. DM., Gulf Bldg., Pittsburgh 30, Pa.
Send me illustrated bulletin on
☐ Gulfcut "Regular" Cutting Oils
☐ Gulfcut Heavy Duty Soluble Oils

Name
Title
Company
Address
City Zone State

SM-5234

WITH FAFNIR MINIATURE BALL BEARINGS YOU GET ALL FIVE IMPORTANT FEATURES



1

VACUUM MELT 440C. Balls and rings of Fafnir miniature bearings are made from vacuum melt 440C stainless steel.

ADVANTAGES. Since vacuum melt steel is extremely clean, balls and races are free from pits and inclusions providing better finishes which result in super sensitive bearings with low torque values.

2

BALANCED DESIGN. Each size bearing has its "tailormade" retainer of predetermined weight and dimensions.

ADVANTAGES. Pitch circle of the balls is centered between bore and O.D. and bearing is symmetrical in design.

3

HARDENED RETAINERS. All retainers are made of hardened 410 stainless steel.

ADVANTAGE. Precise hardening, insured against brittleness and easy breakage by quality control, provides springiness... eliminating bending or distortion.

4

SWAGED RETAINERS. In manufacture retainers are swaged so that ball pockets of retainers are ironed outwardly.

ADVANTAGE. Ball runs against a hardened, smooth surface not a rough edge.

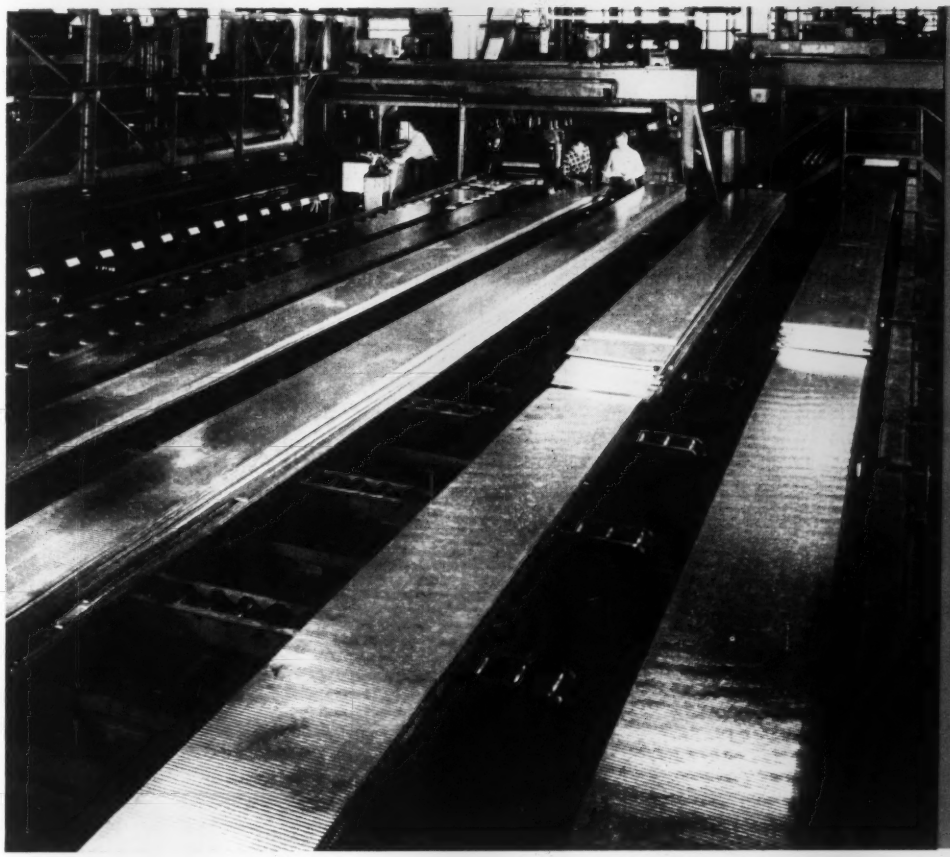
5

HEAT STABILIZATION. All rings and balls are heat stabilized to 600 degrees.

ADVANTAGE. Standard Fafnir bearings may be used for high temperature applications as well as regular applications.

All Fafnir miniature bearing tolerances are to ABEC-7 standards except for the inner ring bores where tolerances are +.0000 —.0002 to provide greater flexibility in selective assembly. Bearing balls are lapped to 2.5 millionths for sphericity and 5 millionths for size variation. Fafnir Miniature Ball Bearings are available in the following types: open; flanged; two shields and flanged two shields. Complete details and dimensions in bulletin No. 469. Write for copy. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS
Most Complete Line in America



A SPECIAL STEEL STUDY

For Busy Men: A 30-Minute Report on a Key Industry

TRENDS IN METALS

Copper and Its Alloys

ABOUT 8000 YEARS AGO, Stone Age man discovered that copper could make his work easier, and a new era—the Bronze Age—was ushered in. Space Age man is still finding ways copper and its alloys can make his products more useful and longer lasting.

Despite intense competition from aluminum, stainless steel, plastics, and other corrosion resistant materials, the copper industry is still expanding. It has lost large markets (such as overhead transmission lines) and could lose portions of others (such as auto radiators). But after each setback, users or producers have come up with new or improved applications. (See Uses, Page 81.)

• **Meeting Needs**—Of course, the industry has problems. Respondents in a STEEL survey of users brought up several. (See Page 78.) They rate price instability as their No. 1 complaint.

Here's the situation copper people face: Copper is a world commodity, and the U. S. is a copper-short nation. Domestic producers account for only about one-third of the Free World's production (see table, Page 78), but this country consumes about two-thirds of the total supply. Price fluctuations of recent years have been influenced largely by conditions unrelated to the domestic economy.

Many users also believe that copper producers should do more research and development, an area in which producers of competitive materials are particularly strong. Some people contend that users do much of the copper industry's R&D work. Copper producers and brass mill officials are aware of that attitude, and they are starting to do something about the problem. (See Pages 87-90.)

• **Sufficient Supply** — The uncertainty of a steady supply of copper and copper-base products has bothered users since World War II. Now the supply situation is better than it has been in years—thanks to the expansion of mining capacity and mill facilities.

1 COPPER PRODUCTION

Producers, ingotmakers, and mill officials gird to reverse the three-year downtrend in shipments. Supply is sufficient to meet foreseeable demand

YOU can now specify copper and copper-base products with good assurance that you won't run into supply problems.

The Copper & Brass Research Association estimates Free World known copper reserves at about 165 million tons—enough to sustain a yearly demand of 3.5 million tons for more than 50 years. But that's on the conservative side. It doesn't account for the billions of tons of uncharted reserves in the U. S., South America, and Africa. Neither does it account for stepped-up efforts of producers to find new sources.

Another factor also must be accounted for: Shipments of most producers have been on the decline during the last three years. The situation is partially explained by the postwar boom: Some customers switched to more abundant metals.

• **Areas of Expansion**—The table on Page 78 shows that the bulk of the expansion in mine capacity from now until 1962 will be concentrated in Chile, Peru, and Africa, where American capital is playing an important role. In addition to the 566,000 tons shown, another

Copper and Copper-base Alloy Producers and What They Make

(See code, Page 77)

Company & Principal Office	Semifinished*	Platers' Anodes	Sheets, Strip	Plates	Bars	Rods	Shapes	Wire	Pipe, Tube	Extrusions	Powder	Shot
AMERICAN BRASS CO. Waterbury, Conn.		1 2	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-6		
AMERICAN METAL CLIMAX CO. INC. New York	1											
AMERICAN SILVER CO. Flushing, N. Y.			1-2-5 6									
AMERICAN SMELTING & REFINING CO. New York	1-2-3 4-5-6	1			1	5	1 5		5			
AMPCO METAL INC. Milwaukee			4	4	4	4	4	4	4	4		
ANACONDA CO. New York	1											
G. A. AVRIL CO. Cincinnati	1-2-3 4-5-6											
BARTH SMELTING & REFINING CO. Newark, N. J.	2-3-4 5-6											
BAY STATE REFINING CO. Chicopee Falls, Mass.	2-3-4 5-6											
BERYLLIUM CORP. Reading, Pa.	7		7	7	7	7	7	7	7	7		
BOHN ALUMINUM & BRASS CORP. Detroit	2-3-4 5-6	4			2-3-4 5-6	2-3-4 5-6	2-3-4 5-6			2-3-4 5-6		
BRIDGEPORT BRASS CO. Bridgeport, Conn.		1 2	1-2-3 4-5-6	2	2-3-4 5	2-3-4 5	2 3	2-3-4 5	1-2-3 4-5-6	2 3		
BRIDGEPORT ROLLING MILLS CO. Bridgeport, Conn.			2-3-4 5									
BRISTOL BRASS CORP. Bristol, Conn.			1-2-3 4-5	1-2-3 4-5	2 3	2 3	2 3	2 3		2 3		
BRUSH BERYLLIUM CO. Cleveland	7		2-5-6 7	7	7		7					
CALUMET & HECLA INC., Chicago and Wolverine Tube Div.	1								1-2-3 4-5-6		1	
CERRO DE PASCO CORP., New York and Lewin-Mathes Co. Div.	1	1			1-2-4	1-2-4		1	1 2			
CHASE BRASS & COPPER CO. Waterbury, Conn.		1	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5	2-3-4 5-6	1-2-3 4-6	1-2-3 4-5		
ESSEX-LEHMAN ALLOYS CO. INC. Newark, N. J.	2-3-4 5-6											

Copper and Copper-base Alloy Producers and What They Make

(See code below)

Company & Principal Office	Semifinished*	Platers' Anodes	Sheets, Strip	Plates	Bars	Rods	Shapes	Wire	Pipe, Tube	Extrusions	Powder	Shot
H & H TUBE & MFG. CO. Detroit			1 2						1 2			
H. M. HARPER CO. Morton Grove, Ill.	1-2-3 4-5-6				1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6		1-2-3 4-5-6		
HENNING BROS. & SMITH INC. Brooklyn, N. Y.	1-2-3 4-5-6											
K. HETTLEMAN & SONS INC. Baltimore	2-3-4 5-6											
C. G. HUSSEY & CO., Div. of Copper Range Co. Pittsburgh			1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6		
INDIANA COPPER CORP. Marion, Ind.	1											1
KENNECOTT COPPER CORP. New York	1											
KENISCO TUBE CO. INC. Mt. Kisco, N. Y.									1			
LEACH & GARNER CO. Attleboro, Mass.					2-5-6			1-2-6	1			
LINDERME TUBE CO. Cleveland									1			
MAGMA COPPER CO. New York	1											
MITCHELL SMELTING & REFINING CO. INC. Botsford, Conn.	2-3-5 6											
MUELLER BRASS CO. Port Huron, Mich.		1			4	1-2-3 4-5-6	2-3-4 5-6		1 4	1-2-3 4-5-6	1-2-3 4-5-6	
NASSAU SMELTING & REFINING CO. INC. Staten Island, N. Y.	1-2-3 4-5											
NATIONAL COPPER & SMELTING CO. Cleveland									1 2			
NEW ENGLAND BRASS CO. Taunton, Mass.			2-3-5 6									
NEW HAVEN COPPER CO. Seymour, Conn.		1	1	1								
NEW JERSEY METALS CO. Elizabeth, N. J.	6											1 6
NORTH AMERICAN SMELTING CO. Wilmington, Del.	2-3-4 5-6											
NORTHWESTERN METAL CO. Lincoln, Nebr.	2-3-4 5-6											
PHELPS DODGE COPPER PRODUCTS CORP. New York	1	1			1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6		
PLUME & ATWOOD MFG. CO. Thomaston, Conn.			1-2-3 5-6									
PRECISION TUBE CO. INC. North Wales, Pa.									1-2-3 4-5-6			
QUINCY MINING CO. New York	1											
REVERE COPPER & BRASS INC. New York		1	1-2-3 4-5-6	1-2-3 4-6	1-2-3 4-5	1-2-3 4-5	1-2-3 4	2 3	1-2-3 4-6	1-2-3 4		
RIVER SMELTING & REFINING CO. Cleveland	2											
RIVERSIDE-ALLOY METAL DIV. H. K. Porter Company Inc., Riverside, N. J.			1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6	1-2-3 4-5-6		
ROCHESTER SMELTING & REFINING CO. INC. Rochester, N. Y.	2-3-4 5											
SCOVILL MFG. CO. Waterbury, Conn.			2-3-5 6	2	2 3	1-2-3 4-5-6	3	2-3-4 5-6	1-2-3 4-6			
SEYMOUR MFG. CO. Seymour, Conn.		1-2-6	1-2-3 5-6			1-2-3 5-6		1-2-3 5-6				
SMALL TUBE PRODUCTS INC. Altoona, Pa.									1-2-3 4			
SOMERS BRASS CO. INC. Waterbury, Conn.			1-2-5 6									
STAMFORD ROLLING MILLS Springdale, Conn.			1 2									
THINSHEET METALS CO. Waterbury, Conn.			1-2-5 6									
WATERBURY ROLLING MILLS INC. Waterbury, Conn.			2-3-5 6									
WHITE PINE COPPER CO., Div. of Copper Range Co., White Pine, Mich.	1											

*Includes ingots, cakes, billets, cathodes, wire bars, and blister.
1=Coppers, including electrolytic, oxygen free, deoxidized, and fire refined.
2=Brasses, including such alloys as Muntz metal, yellow brass, cartridge brass, low brass, red brass, jewelry brass, commercial bronze, and gilding metal.
3=Leaded bearing bronzes, including such alloys as architectural bronze, forging brass, free cutting brass, leaded flanging brass, high, medium, and low leaded brasses, and leaded commercial bronze.
4=Special brasses, including such alloys as manganese bronze, naval brass, inhibited admiralty brass, inhibited aluminum bronze, and silicon bronze.
5=Tin bronzes, including such alloys as the phosphor bronzes, leaded phosphors, and 444 bronzes.
6=Cupro nickel and nickel silvers.
7=Beryllium copper.

140,000 tons are scheduled to be brought in after 1962.

• **Technology Keeping Step**—Smelter and mill capacity is keeping pace with the expanding mine capacity, and techniques are being developed which will increase efficiency and improve the products. For example, the use of oxygen in the conversion of matte was proposed at a recent meeting of the American Society of Mining, Metallurgical & Petroleum Engineers by E. F. Kurzinski, manager of sales development engineering, Air Products Co., Allentown, Pa.

The top-blowing technique, which is similar to that used by steelmen, might greatly increase production rates over present converter practice, says Mr. Kurzinski.

• **Ingotmakers Act** — Producers of brass and bronze ingots are also taking steps to improve their markets. Members of the Brass & Bronze Ingot Institute, Chicago, are waging a three-pronged offensive—research, education, and promotion.

For example, it is sponsoring a continuing research program at Battelle Memorial Institute, Columbus, Ohio. Its aim: To promote new applications by helping designers and engineers. They are supplied with authoritative data on many mechanical and physical properties of brass and bronze—information that had not been available before.

• **Mills Expand**—Brass and bronze mills are completing a three-year expansion program which has resulted in greater penetration in three market areas: Pacific Coast, East, and Midwest.

Projected Free World Copper Mine Capacity*

(Net tons—thousands)

	Additional Capacity 1958-62	Scheduled Capacity 1962
U.S.	65	1,272
Canada	60	436
Chile	119	722
Peru	120	185
Europe	37	162
Asia	26	238
Africa	187	1,076
Australia	32	93
Others	5	91
Less mine depletions	85	85
Net Total, Free World	566	4,190

*Based on announced expansions.

How Much Copper Users Buy

(PERCENTAGE DISTRIBUTION BY ANNUAL CONSUMPTION)

(Tons)	1959	1958	1957
Less than ½	9%	12%	13%
½ to 2½	23%	22%	22%
2½ to 5	12%	14%	13%
5 to 12½	12%	14%	15%
12½ to 25	9%	8%	6%
25 to 50	10%	9%	9%
50 to 150	11%	10%	11%
150 to 250	5%	2%	2%
More than 250	9%	9%	9%

2 COPPER SURVEY

Outlook is for steady increases in consumption. In check of 3000 metalworking plants, STEEL found: Over half plan to expand their requirements over next five years

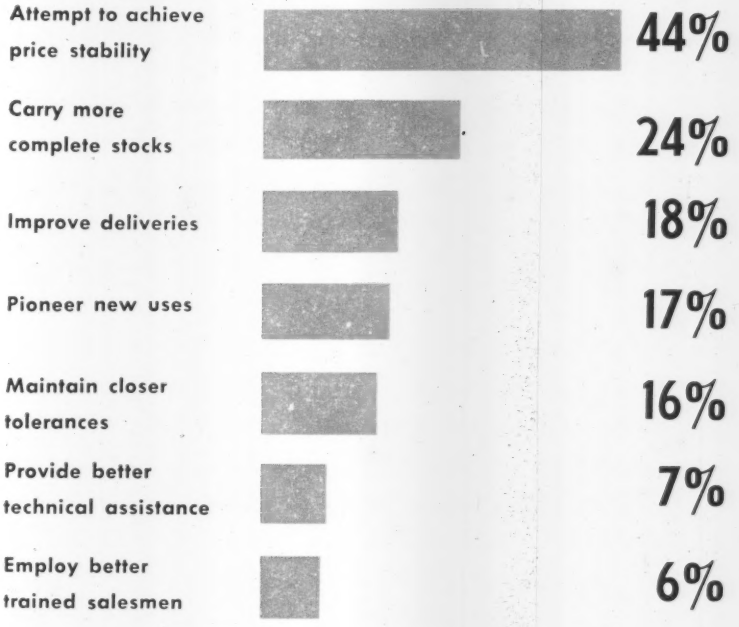
YOU can count on copper to be among the metals that will go places during the next decade.

That prediction is based on a survey of 3000 metalworking plants. All are users of copper and copper-base products. STEEL checked on what they are doing with them today and what they plan for tomorrow.

• **They'll Buy More**—Though respondents complain about price fluc-

How Suppliers Can Help Users

(PERCENTAGE OF RESPONDENTS WHO LIST EACH FACTOR)



tuations (see above), more than half say they'll boost their consumption by 1963. The breakdown:

18 per cent will use up to 10 per cent more.

18 per cent will boost their usage by 11 to 20 per cent.

10 per cent will buy 21 to 30 per cent more.

6 per cent will hike their consumption more than 30 per cent.

8 per cent will reduce their usage.

40 per cent see no change in their buying patterns.

Nineteen of every 20 respondents will use as much or more copper and its alloys next year as they plan to consume this year (56 per cent will use more). About one-third plan to buy less in '58 than they did in '57—largely due to the recession.

• **Inventory Status**—Some consumers have been buying in excess of their needs this year because the price of the metal has been down. One big user told STEEL he revised his maximum inventory level from 90 to 120 days and is holding stocks at that peak.

However, 34 per cent of respondents say their inventories are lower now than they were in the 1955-57 period. Nearly 60 per cent say current inventories are the same as they were during the 1955-57 period; 6 per cent have higher stocks. More than one in four respondents now have supplies exceeding 60 days; 11 per cent have stocks in excess of 90 days. The most popular level is 30 to 60 days; 36 per cent of users are in that category.

In some companies, purchasing agents have more authority when they are buying copper than they have with any other metal. They are given greater leeway on minimum and maximum inventory requirements; they're allowed to "play the market."

• **Potential**—The metal's big future lies in the expansion of present major markets: Electrical, building, and autos. Those industries buy about three-fourths of all copper products made. So the metal is tied to their growth. Add to that: 19 per cent of the respondents are planning new uses (although they refuse to name them for competitive reasons).

• **But Users Have Complaints**—While 95 per cent of the respondents say their specifications are consistently met by producers, one of every four would like to see new or improved properties. Their most pertinent wants include:

Greater tensile strength without sacrificing high electrical and thermal conductivity.

Better machinability in nonleaded grades.

Consistency in grain size and temper from lot to lot.

Better finishes.

Greater resistance to oxidation at elevated temperatures.

Improved wear characteristics.

Greater strength at no sacrifice in ductility.

Better bronze bearing alloys.

A high strength electrical conductor at 570 to 750° F.

A copper-base alloy with good ductility, high thermal conductivity, and high strength at elevated temperatures.

Closer tolerances.

Greater ductility.

Better spring life.

• **Reasons for Nonuse**—Consumers list price fluctuations first. They maintain that mill pricing methods are "antiquated." To document their case, they cite copper's price trend over the last three years: In January, 1955, the average delivered price of electrolytic copper (mean of primary and custom smelter) was about 30 cents per pound. By September, 1955, it had climbed to 45 cents—a 50 per cent increase in eight months. It hit a peak of about 50 cents in March, 1956, then dropped back to 31.5 cents by March, 1957—a 37 per cent drop in one year. By March of this year, it had declined to 24.2 cents. Last month, the average edged up to 26.4 cents; and more increases are going through this month.

Users are also wary of the supply situation; they remember more than a decade of procurement difficulties (1940-56), and some say the availability of better technical data would lead to more efficient

Where Users Buy Copper

(PERCENTAGE OF USERS WHO BUY FROM EACH SOURCE)

DISTRIBUTORS and WAREHOUSES	77%
MILLS	53%
PRODUCERS	16%
INGOTMAKERS	5%
SCRAP DEALERS	2%
OTHER SOURCES	8%

What They Buy

(PERCENTAGE OF RESPONDENTS WHO BUY EACH FORM)

COPPER AND COPPER-BASE ALLOY PRODUCTS:

Rods	45	Shapes	10
Bars	44	Forgings	9
Tubes	42	Anodes	9
Sheets	38	Ingots	5
Strip	37	Powder	4
Wire	35	Wire bars	2
Castings	32	Cathodes	1
Pipe	13	Billets	Less than 1
Plates	12	Cake	Less than 1
Extrusions	11	Other	3

COPPER AND COPPER-BASE ALLOYS:

Free cutting brass	53	Nickel silvers	15
Phosphor bronzes	43	Silicon bronzes	9
Low zinc brasses (20% or less zinc)	28	Oxygen-free copper	9
Electrolytic copper	21	Tin brasses	8
High zinc brasses (More than 20% zinc)	18	Forging brass	7
Aluminum bronzes	16	Cupro nickels	6
Leaded brasses (other than free cutting and forging)	15	Deoxidized copper	6
		Other	5

use of the metal. For example, material engineers at Westinghouse Electric Corp., Pittsburgh, want more complete data on the temperature coefficient of thermal conductivity at high and low temperatures. Users say lack of information leads to "designing on precedent, not accurate knowledge."

They contend that producers should do more research and development—much of the pioneering, they say, has been done by consumers.

Some believe an "organized sell" campaign by producers would lead to greater usage; design engineers have been deluged with information and promotion from the aluminum industry.

• **Competitive Materials**—A small but significant number of respondents report they are replacing copper and copper-base products with other materials, notably aluminum. Two Westinghouse divisions have switched largely to aluminum for bus bars, a high volume item. Westinghouse has also replaced copper and brass with aluminum in evaporator parts for refrigerators and many components in watt-hour meters. (Examples: Shafts, discs, hands, dials.) Other firms have replaced copper with aluminum for many structural parts. Plastic pipe is making some inroads into copper pipe markets. Stainless steel also is mentioned as a replacement.

• **Types Most Used**—More respondents (45 per cent) buy rods than any other form. Free-cutting brass is the most popular alloy used (see table at left).

• **Fabricating**—Types of fabricating and the percentages of respondents doing each include: Drilling or tapping (64 per cent); turning (53 per cent); milling (50 per cent); threading (50 per cent); stamping (42 per cent); forming (38 per cent); soldering (34 per cent); brazing (34 per cent); welding (26 per cent); deep drawing (18 per cent); spinning (7 per cent); other machining (22 per cent). (See fabrication section, Page 87.)

Less than 1 per cent of the users do all of the types of fabricating named above. But 48 per cent do five or more types, and 8 per cent do ten or more.

• **Finishing**—Finishing operations and the percentages of respondents performing each include: Buffing or polishing (33 per cent); plating (30 per cent); tumbling (28 per cent); applying paints, lacquers, or enamels (28 per cent); bright dipping (21 per cent); applying other finishes (8 per cent).

Most popular metals used with copper in plating include: Chrome, nickel, silver, cadmium, zinc, steel, and tin.

3 COPPER USES

Look for robust growth in electrical and electronic applications, the metal's biggest market. New bearing could boost railroad sales. Aluminum dims auto outlook

COPPER is versatile.

In fact, the acceptance of it and its alloys is so universal that we tend to take them for granted.

The materials are practically synonymous with all things electrical, and they have myriad uses in construction, autos, aircraft, missiles, railroad equipment, marine equipment, appliances, machinery and equipment, scientific instruments, utensils and jewelry, cladding, and many other applications.

More important, trends in usage are ever changing. This section will bring you up to date and also give you a glimpse at the future.

Electrical Uses

Half of all the copper consumed goes into electrical applications, including power transmission, communications, electronics, electrical equipment, transportation, and complex weapon systems.

• **Power** — Construction (homes, plants, office buildings), power generation and transmission are the biggest users.

Virtually all building wiring is copper, as are lines leading from power cables. Scores of small component applications are in the same category. In office buildings, elevators and air conditioning units take large amounts of wire and cable. Those and other numerous electrical uses take many components requiring copper. Many plants are small utilities in themselves and have hundreds of electrical applications employing copper, ranging from wiring and in-plant overhead power cables to uses in electrical generation equipment and production machinery.

The transmission of power continues to be a major market even though aluminum has taken over virtually all overhead high voltage lines. Power generation is also a gigantic market for copper. Examples: Heat exchangers, windings in motors, generators and transformers, magnet wire in control apparatus, and busbars.

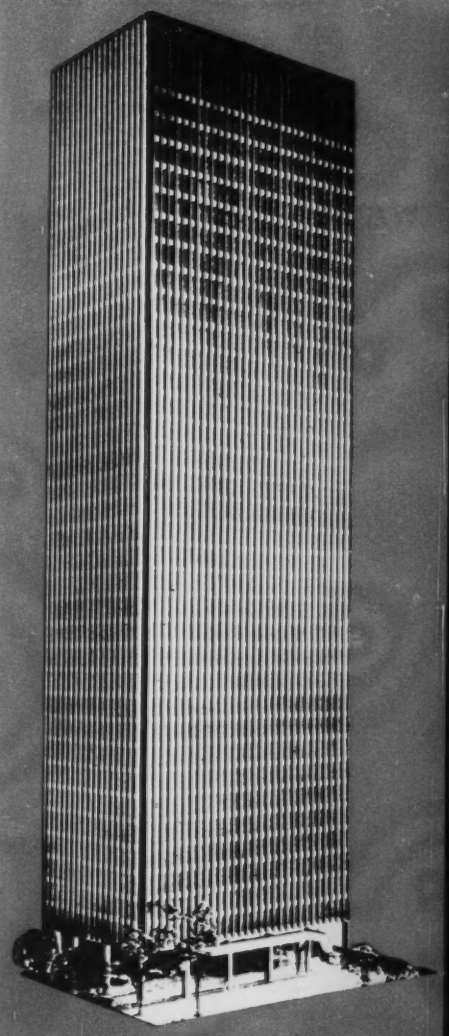
• **Underground Market** — Copper still dominates in high voltage underground lines. Consolidated Edison Co. of New York Inc. has 326 million lb of copper in its cable system, 90 per cent of which is underground, says David Williams, manager of the company's cable bureau.

Demand for underground power cable should increase as the population expands, although utility companies with overhead lines are expected to resist the change as long as they can. So far, utilities have found aluminum impractical for this use. But another challenge may be in the making: The aluminum industry is developing an underground cable.

Since 1950, use of electricity in many homes has tripled. In the next eight years, utility companies expect to double present capacity.

• **Communications** — Telephone and telegraph wire and cable are two of the biggest markets. The only way they can go is up. Telephones tied in with the central office equipment add up to a tremendous market. Hundreds of components in radio equipment and telegraph receiving and sending equipment employ copper. Coaxial cables also take a lot of copper.

• **Printed Circuits**—Copper's conductivity has made it a major material in this rapidly expanding application. The biggest market has been in radio and TV sets, but the stage is set for widescale application



PIONEER—World's first bronze skyscraper is New York City's 38-story Seagram Building. Here are some of the materials that went into it:

MULLIONS
2,725,000 lb
Architectural Bronze

SPANDRELS and LOUVERS
475,000 lb
Muntz Metal

PIPE
250,000 lb
Red Brass

ELECTRICAL WIRING
73,000 lb

AIR CONDITIONING SYSTEM
47,800 lb
Copper

TOTAL 3,571,000 lb
Copper and Copper-Base Alloys

Source: Copper & Brass Research Association.

Who Buys Copper Products?

STEEL surveyed 3000 metalworking companies that sell products containing copper or its alloys. Over 300 customer categories and products were named. Here's a breakdown which shows major markets:

28% sell to . . . . . Automotive Industry
24% sell to . . . . . Machinery (nonelectrical) Industry
24% sell to . . . . . Machinery (electrical) Industry
23% sell to . . . . . Appliance, Utensil & Cutlery Industries
20% sell to . . . . . Other Transportation Industries
16% sell to . . . . . Heavy Construction Industry
10% sell to . . . . . Plumbing Goods Industry
5% sell to . . . . . Fastener Industry
43% sell to . . . . . Other Industries

Source: Anaconda Co.

MAJOR USE—Electrical applications sumed. Typical are these interplant neoprene jacketed copper)

in such appliances as kitchen ranges and washing machines. Electronic computers hold tremendous potential, as do printed circuits for automobile instrument panels (they will be standard on GM cars by 1960). The only hitch: Users are convinced that aluminum will ultimately enter the field.

• **Computers**—Each Univac I and II (made by Remington Rand Corp.) contains 15,947 lb of copper and its alloys. Over 20 different applications are involved.

• **Status**—Wire and cable uses in communications and the generation and transmission of power will keep pace with our population. A host of new electrical and electronic applications are hiking copper's stock in the electrical field. But aluminum continues to nibble away at many markets.

Construction

The most dramatic example of the red metal's use in architecture is the 38-story Seagram Building in New York City. It marks the first application of bronze curtain walls in building construction. About 3.6 million lb of copper and its alloys went into the structure.

It's doubtful if copper alloys will ever become major structural materials, say contractors and architects. But look for increased functional-decorative uses of the bronzes and brasses in building and bank fronts, paneling and trim on escalators and elevators, balusters, handrails, vestibules, and door frames.

• **Roofing Products**—Sheet copper roofing isn't a mass market, but applications usually take pretty large poundages.

Major markets are: Gutters, downspouts and heads, flashing, fittings, and accessories. Two materials are in competition: Several manufacturers report a trend toward greater use of aluminum and stainless steel.

• **Plumbing Goods** — Copper and its alloys are used in tank lever lift arms, toilet tank trim, lavatory fittings, tub fittings, faucets, traps and drains, closet tank components, flush valves, piping and tubing, and other fixtures.

Copper and red brass are found frequently in plumbing applications. They offer noncorrosive properties and are easy to cast and machine (or otherwise fabricate).

A product with promise: DWV (drain, waste, and vent lines) copper tube. When it was introduced in 1955, its use averaged 1.3 lb per housing start. The figure was up to 8.8 lb last year.

• **Builders' Hardware** — Brass, bronze, and their alloys are used in the line of builders' hardware that includes locks, door knobs and knockers, door stops, hinges, bolts, latches, and safety hasps. The materials are popular because they are decorative, noncorrosive, and easy to fabricate.

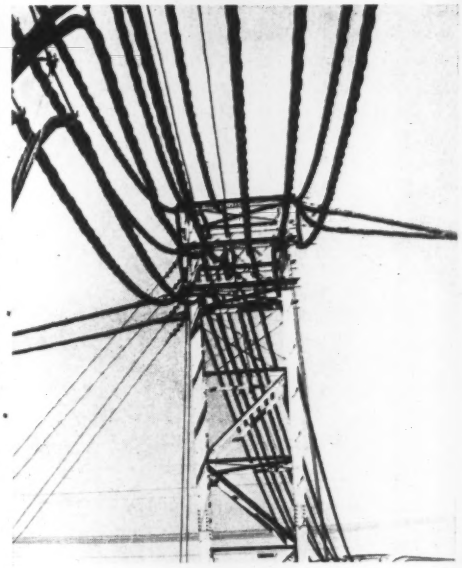
Automotive

Cars and trucks account for about 8 per cent of U. S. copper consumption. A luxury model may sport the metal and its alloys in as many as 50 applications.

Volume uses are in radiators, heaters and defrosters, air conditioning units, bearings, bushings, carburetors, generators, oil lines, strainers, wiring, switches, and plating.

• **Forms** — Major uses take sheets, plates, and wire; secondary uses, rods, bars, and foundry products. Here's a breakdown of applications in the 1958 Willys Jeep: Mill products, 28.3 lb; electrical wire, 8.5 lb; foundry products, 1 lb; plating, 0.4 lb.

Use of copper tube is declining. The trend is toward the neoprene product in many applications.



account for about half of all copper con-
high-voltage power cables (rubber insulated

Buick has been using neoprene in some hydraulic lines for two years.

• **How Much?**—The average 1958 auto used 40 to 50 lb of copper. Examples: Chrysler Corp. cars took 42 to 45 lb each; Chevrolet, 35 to 37 lb; Lincoln, 70 lb; the average Ford, around 36 lb. Small trucks use 50 to 55 lb; larger models require up to 60 lb.

The 1959s use about the same amounts as the '58s. Ford says its average is 35 lb.

• **Growth**—Two uses could spur automotive demand. 1. Air conditioning units could be the biggest single application. Each unit takes up to 30 lb. (Car buyer acceptance will be the deciding factor here.) 2. Pontiac is using a double copper plating on exterior cold-rolled steel parts. Acceptance of the double coating by other carbuilders would make for a nice piece of business.

• **No. 1** — Radiators, the biggest single application today, take 13 to 20 lb, depending on the car.

There's a good chance that copper will eventually lose part of this market to aluminum.

Aircraft

This market has been shrinking since defense emphasis was switched from manned aircraft to missiles. But planes being built use sizable amounts of copper and its alloys.

• **Where**—The maze of wiring in a plane's electrical system takes more copper than any other use in this industry.

• **Amounts**—The Lockheed Super Constellation takes 2740 lb of copper and its alloys. Breakdown: Wiring, 2302 lb; foundry products, 294 lb; brass mill products, 144 lb. The Boeing 707 uses over 2000 lb in its electrical system, bushings, bearings, and hinges. Breakdown: Copper wire, 1500 lb; aluminum bronze, 470 lb; phosphor bronze, 42 lb; and architectural bronze, 21 lb. Republic's RF-84F Thunderflash uses 634 lb of copper and its alloys (305 lb go into wiring).

• **Trend**—It's pretty certain that electronic and electrical systems in high performance aircraft will multiply. A tenfold gain in copper usage per plane is possible, believes Convair Div. of General Dynamics Corp.

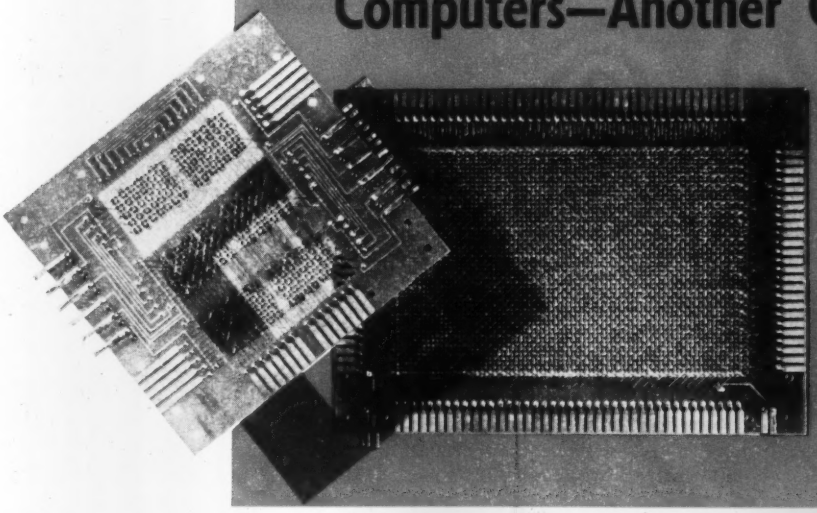
Missiles

Copper is a minor, though essential, metal in the nation's missile arsenal.

As in aircraft, the major use is in wiring systems.

• **Example**—Western Electric Co. lists these applications of copper in the Nike Hercules: It's used in electrical wiring, splices, sleeves, plugs, jumpers, busbars, and connectors for its high conductivity. Small parts of the inertia-type switch (used in the arming mechanism of the warhead section) are made of copper because of its corrosion resistance and machinability. Sintered bronze filters are used throughout the hydraulic system because they cost less than their steel

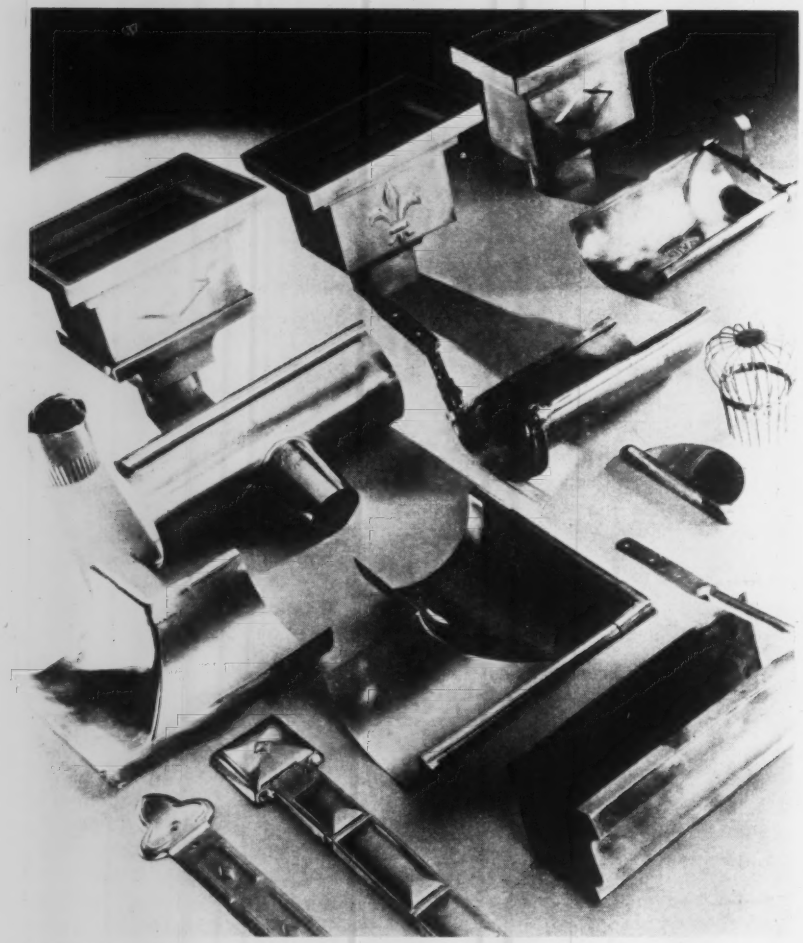
Computers—Another Growing Market



Copper Use in Univac I and II

Copper	6697 lb
Beryllium Copper	931 lb
Brass	273.5 lb
Bronze	482.5 lb
Phosphor Bronze	7563 lb
Total	15,947 lb

Source: Remington Rand Corp.



OVERHEAD—Copper roofing products account for a large segment of sales to the construction industry. Shown are leaders and gutters, elbows and shoes, miters and end caps, straps and hangers, and miscellaneous items

counterparts. A beryllium copper snap ring is used in the missile thrust limiter. Its modulus is better than that of spring steel. Bronze bearings are used because of their good wear resistance. A phosphor bronze spring assembly is used in a four-way solenoid valve because it has a good spring constant.

• **Atlas**—This ICBM employs 180,000 ft of copper wire, says Convair. Copper tube is found in hydraulic and pneumatic systems. Limited uses include fittings, small bushings, and bearings.

• **Future** — Don't look for many new applications for copper in missiles. Convair thinks usage in the Atlas will stay at present levels. Lockheed believes the trend in construction (other than wiring) "is away from copper to materials with lower densities and better mechanical properties."

Thermal properties of copper and its alloys hold promise for "heat sink" applications. It's rumored that standard nose cones for the Atlas and Thor depend on a heavy copper layer: It absorbs re-entry heat, stores it until the missile has slowed down sufficiently, then re-radiates the heat to the atmosphere.

Railroads

In this market, copper finds its big uses in diesel locomotives, passenger cars, switching and signal equipment. The average Pullman car uses almost 2000 lb of copper tube (and some sheets) in the water supply system, air brakes, heating system, air conditioning unit, condensers, evaporator coil, and heat coil. New commuter cars built by the Budd Co., Philadelphia, for the Pennsylvania Railroad contain over 1000 lb of copper. Breakdown: Wire, cable, and busbars, 715 lb; tubing and fittings, 355 lb; miscellaneous electrical parts, 56 lb. More copper is used in equipment Budd buys. Examples: Air brakes, air conditioning units, heating systems.

You'll find scores of uses in diesel locomotives. Major ones include wiring commutator segments in generators and traction motors.

• **New Bearing**—American Brake Shoe Co. has developed a cartridge-type journal bearing for freight cars which is designed to replace the saddleback journal bearing.

Seventy lb of high-leaded bronze are used in each unit, vs. 7 lb in the saddleback bearing. Significance: 1.5 million cars are in regular interchange service; each car uses eight of these bearings. So an 840 million lb market for copper could be in the making.

Marine

Tankers, cargo ships, pleasure craft, passenger liners, and naval vessels take advantage of copper and its alloys in hundreds of ways.

• **Common Uses**—Naval brass is widely used for propeller shafting (because of its strength, torque resistance, machinability, and corrosion resistance); manganese bronze for struts and rudders (high strength and corrosion resistance); silicon bronze for fastenings and water tanks; soft and hard drawn copper for exhaust yokes, fuel lines, water lines, and piping (resistance to corrosion and leaks, workability, long life).

Boat and ship propellers are among the heavy poundage applications. (Manganese bronze is generally used.)

• **Underwater** — The Navy's nuclear submarine *Skipjack* uses brass in capstans, torpedo tubes, diving gear, and valves; more than 48,000 ft of copper tube in hydraulic, air, and lubricating oil lines; and over 6000 ft of cupro nickel tube

in auxiliary cooling lines, heat exchangers, lavatories, bilge pumps, and salt water service lines.

• **Growing Market** — Salt water shipboard pumps are mostly of bronze construction because of the alloy's corrosion resistance.

Appliances

Per unit use of copper in appliances has about reached its saturation point, but the market will become increasingly important as sales gain momentum. One qualification: The development of substitute materials, especially aluminum (for such things as wiring and tubing) could result in a tighter market.

• **Washing Machines**—L. R. Ardis, vice president of the Norge Div., Borg-Warner Corp., says 6 to 7 lb of copper and its alloys (per unit) go into motor windings, electrical switches, wiring harnesses, and sintered bearings. Reasons: Electrical conduction qualities; and rust resistance in bearing applications.

The Speed Queen Div. of McGraw-Edison Co. uses copper and its alloys in motors, powdered metal bearings, and wiring harnesses.

• **Air Conditioning Units** — Major uses are in heating and cooling coils and condensers, refrigeration tubing, fan and compressor motors. One major manufacturer has about 20 lb of copper in his air conditioning units. General Electric Co. estimates it uses 75 lb per unit in its line of packaged air conditioners, heat pumps, and water coolers. Adolph Ruediger, director of purchases, Carrier Corp., lists applications (potentiometers, freezers, small air conditioning units, and large condensers) that take a fraction of a pound to 16,150 lb each.

Besides pure copper, users buy commercial bronze, cupro nickel, admiralty brass, phosphor bronze, and red brass.

• **Refrigerators** — The Kelvinator Div. of American Motors Corp. uses 1 lb 14 oz of copper in household refrigerators and 2 lb in commercial units.

Another major producer breaks down his usage this way: Copper, 4 lb 6 oz; brass, 3 oz; bronze, 1.5 oz.

• **TV Sets**—All Radio Corp. of America TV sets use printed circuits (a copper sheet is laminated to a plastic board). Vincent Goubeau, vice president of materials, says applications run into the hundreds. About two-thirds of the 2076 parts in RCA's 21-in. color TV utilize copper or brass.

Equipment

The biggest applications here are in motor and other electrical equipment—where high conductivity is a factor. Other applications generally exploit copper's corrosion resistance and ease of fabrication.

• **Turbines** — This is one of the largest uses in the industrial equipment field—it accounts for about 1 per cent of all copper consumed in the U. S.

Worthington Corp. employs bronze in worm wheels (for wear resistance); bronze in oil baffles (to avoid shaft abrasion); brass or bronze in check valves and cast bronze levers; and some manganese bronze in governor lever parts.

• **Heat Exchangers**—This is another growth market for copper and its alloys. A major refinery cites this breakdown of alloy use in its heat exchangers: Cupro nickel tube, 2.3 million lb; naval brass and Muntz metal plates, 600,000 lb; aluminum bronze plates, sheets, and bars, 100,000 lb; aluminum bronze weld wire, 25,000 lb.

Scientific Instruments

Yearly consumption in this field comes to about 2 per cent of the U. S. total.

• **Where**—Elgin National Watch Co., Elgin, Ill., utilizes copper in watches, clocks, and relays; Bausch & Lomb Optical Co., Rochester, N. Y., uses it in microscopes, projectors, and other equipment; Federal Products Co., Providence, R. I.,

Copper in an Automobile

WHEELING ALONG—Copper has held on to its share of the auto market. Typical uses of the metal and its alloys are indicated by dark areas. Aside from wiring, the material is used in radiators, distributors, carburetors, generators, crankshafts, brake cylinders, and oil filters. Wiring installations take the most copper in cars (51%). Radiators account for 40%; heaters 6%; tube and miscellaneous parts, such as washers and rivets, 3%

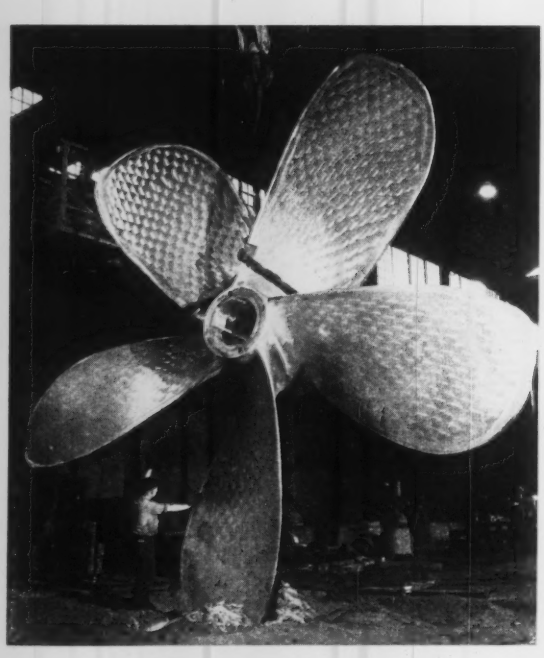
1959 FORD

Radiator	14.00 lb
Wiring	17.85 lb
Heater	2.1 lb
Misc. Parts*	1.05 lb
TOTAL	35.00 lb

*Includes tubes, rivets, thrust washers. Does not include 5 lb scrap allowance.
Source: Ford Motor Co.

COPPER: Decorative, Rugged

DECORATIVE—Copper and brass cookware and utensils are generally sold as "quality" products. Although they are not in a mass market category, they are in wide use



RUGGED—Marine uses represent a growing market. This manganese bronze ship propeller is among the largest ever built. It measures 24 ft 8 in. and weighs more than 38 tons—about 24.7 tons of copper were required. Eddystone Div. of Baldwin-Lima-Hamilton Corp. built it

uses it in the wiring and some of the small washers in its electronic gages.

• **Trend**—Elgin thinks its per unit use of copper will hold steady. Bausch & Lomb expects to increase its use of aluminum as a substitute for some copper alloys.

Utensils and Jewelry

Solid copper, brass, and bronze are the popular materials in this segment of the market. They are used in the manufacture of such things as: Brass and bronze medallions; solid brass furnishings, such as towel bars, curtain rods, wall hooks, and soap dishes; copper jewelry; cookware; tableware; and bronze and brass plaques and signs.

• **Trend**—The relatively high cost of these products will probably keep them from ever reaching the mass market level. Gains in population and disposable income will make for steady growth, users predict.

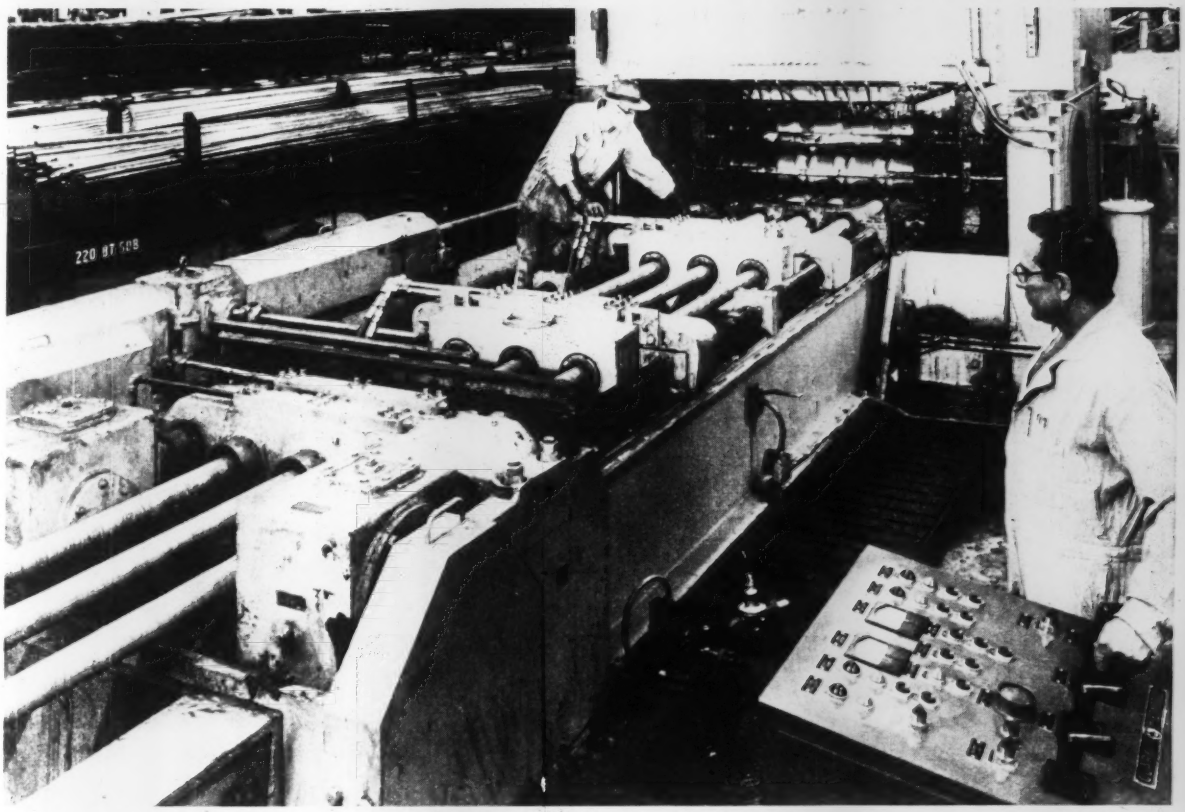
Water Distillation

Increasing world population and spreading industrialization signal the need for economical systems to convert salt and brackish water to fresh water. Copper's resistance to salt water corrosion and its heat transfer properties qualify it for conversion units.

One experimental residential unit uses 60 lb of copper and its alloys in the form of tube, forgings, and spinnings.

Copper Clad Metals

Combinations involving copper and other metals are riding an uptrend. Examples: 1. Copper clad stainless steel is used for cooling plates, fins for space heaters, and cooking utensils. Use in wave guides (radar components) looks promising, says Metals & Controls Corp., Attleboro, Mass. 2. In another product, aluminum and iron layers are bonded to both sides of a copper core to make a five-layer strip material for radio tube anode plates. 3. Copper clad aluminum is finding usage in wave guides, components cases or cans, and variable capacitor blades.



TUBE REDUCING is one of the newer ways to handle copper. It's slower than drawing but more accurate. This machine at Wolverine Tube, Detroit, is taking 3-in. stock down to 1½ in. (OD)

4 COPPER FABRICATION

Campaign to hold cost line finds expression in better mill techniques, new joining devices, and cold forming. One firm is making strip from powder

"THE HEAT'S ON."

That's the way a copper official describes his efforts to find newer, better ways to make improved products at lower cost.

It's evidence that copper people recognize this fact: Other materials have made deep inroads into their markets as the result of cost and sometimes better research and development by the competition.

Copper companies are striking back with intensive programs of their own. Wolverine Tube Div., Calumet & Hecla Inc., Detroit, is typical of the major copper firms interviewed by STEEL. Its technical manager, J. M. Keyes, says: "Compared with what we were doing five or ten years ago, we are spending 1000 per cent more in the effort to push ahead." That figure takes inflation into account, he adds.

Here are the trends:

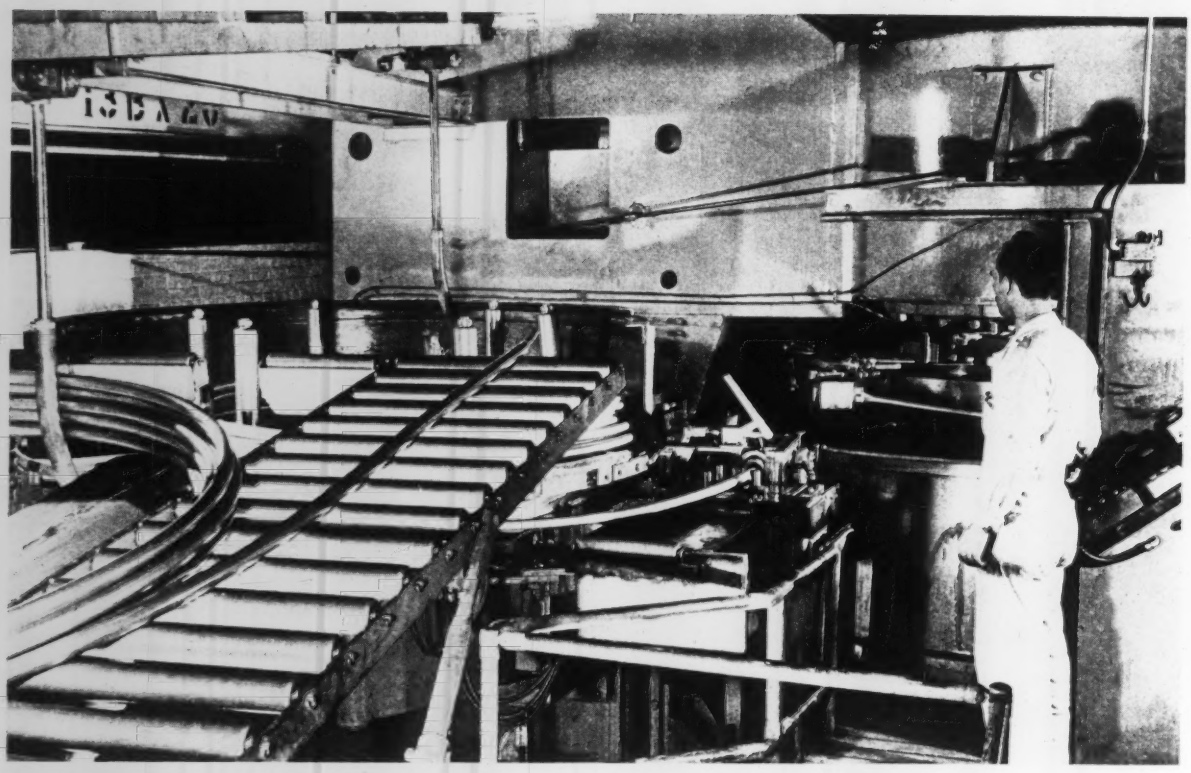
Mill Techniques

Brass mill people are finding that running on a continuous basis is a lot cheaper than the traditional short run or custom lot methods.

Wolverine Tube's Detroit installation is a good example. It starts with a relatively large billet and works it without cutoffs at speeds up to 2000 fpm. The end product (tube in coils) may be as long as 5000 ft.

Phelps Dodge Copper Products Corp., New York, is building a $50-million tube mill in New Jersey. It will use the same technique: Start with a large billet, make the mill completely automatic, then end up with more than 2 miles of tube in one giant coil.

- **Eliminate Waste** — Researchers are going strong for ideas that cut weight and material. In analyzing



GIANT DRUMS turn at 2000 fpm at Wolverine Tube's Detroit drawing mill. In some sizes, coils hold 5000 ft. New eastern plant (Phelps Dodge) aims at 10,000-ft coils

their own products, they turned up many examples of overdesigning. Take the $\frac{3}{8}$-in. copper tube used in refrigerators and air conditioners. A short while ago a 0.030-in. wall was standard. Today, some are using 0.016 in.

The longer length of tube in one coil is an aid to those who have automatic equipment. Tube end loss is eliminated.

• **Other Improvements**—F. M. Levy, Mueller Brass Co., Port Huron, Mich., says that recent advances in continuous casting of rods make for improvements in machinability and part uniformity.

With the new semicontinuous (often called continuous) pouring, the metal is agitated less, the lead more evenly distributed, and the mechanical suspensions in alloys are less likely to be broken up or shaken out.

Tube reducing machines have made the internally finned product possible. The mandrels are grooved to receive the copper as it is rolled and reduced. Added to external finning by thread rolling, the wrinkle greatly increases heat transfer efficiency.

Casting

If you take a look at the statistics, you'll notice casting people are taking to shell molding, although not nearly so much as ferrous founders. Even though surface finishes are not better than those of regular sand castings, tolerances are—and that means less machining.

In spite of those statistics, watch diecasting, say sources close to the industry. Advantages: It can cost less and produces more parts in a short time; parts have a superior surface finish, closer dimensions, and need less machining.

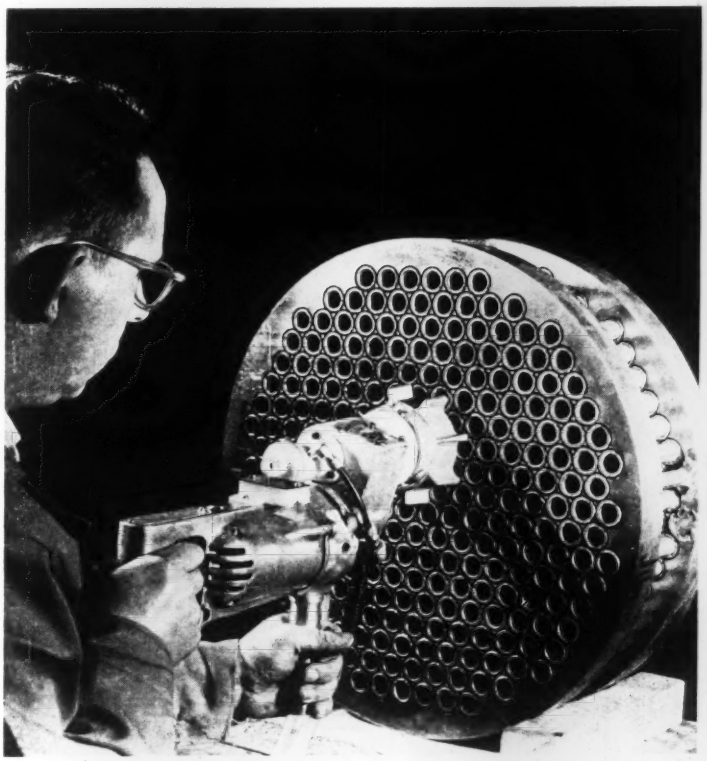
Here is the reasoning behind that prediction.

The experience with aluminum established a pattern that copper people would like to follow. (A high percentage of founders handle both metals.) In 1950, diecastings made up about 30 per cent of aluminum casting production. In 1956, the figure rose to more than 47 per cent.

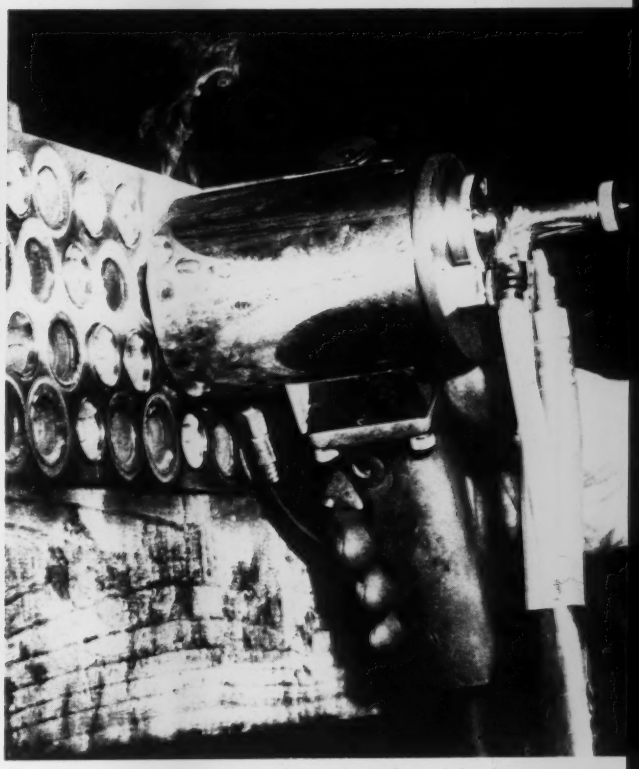
• **Holdup**—Die trouble is the one bridge that copper has yet to cross. Aluminum is cast at about 1100° F, copper near 2000° F. At those temperatures, you get 250,000 aluminum pieces per die, only about 5000 copper pieces. (Hot die steels develop hard-to-see heat checks which appear prominently on the finished part.) Plungers used to force metal into molds present another problem.

• **Solution**—Work is being done on cheap duplicate dies. By using the original as a pattern, diemakers can cast several and machine them with comparative ease.

The Shaw process is a leading contender for making such dies. Its outstanding feature is a semiflexible refractory compound which can be taken off patterns with no draft or a slight undercut. When removed, it returns to the same dimension as the pattern. After baking and processing, the molds are mounted in flasks and poured.



Source: Allis-Chalmers.



Source: Revere Copper & Brass Inc.

THESE DEVICES WELD COPPER TUBES to header sheets automatically. Operator places pilot in hole, presses trigger, and tubes are welded. They illustrate trend to automatic welding

Joining

Most firms queried by STEEL report that inert gas shielded arcwelding is one of the best things that ever happened to copper. New techniques make the process more attractive to the average user. Many devices are entirely automatic.

For more than two years, Linde Co., a division of Union Carbide Corp., New York, has been developing the application of copper rotating bands to artillery shells. Traditional way to handle it: Press, shrink, or swage a ring into a machined groove on the shell. To date, Linde has made thousands of welded shells (20mm to 8 in.) for the Army Ordnance Department.

The company uses two methods: Heliarc for the small shells, Sigma (with both hot and cold wires) for the larger ones. Big shells will support a fairly large weld puddle.

• **Trend**—Air conditioning people are faced with demands of architects to cut down the size of the ductwork in new buildings.

The problem with small ductwork has been that blower pressures and air velocities must be stepped up drastically. Many central systems operate with 12 in. of water gage pressure. That means ordinary joints (Pittsburgh, lock seam, S-strips) are inefficient and leak too much.

The solution: Inert gas shielded arcwelding (Sigma) with 0.030-in. copper wire. It saves the galvanized coating.

• **Trend**—Heliarc cutting, first successful on aluminum, also works well on copper and its alloys (especially brasses).

• **Trend**—Nuclear reactors take a tremendous amount of copper alloys in heat exchangers. Since corrosive water can play havoc in leaks, such equipment has to be welded.

Both Allis-Chalmers Mfg. Co., Milwaukee, and Revere Copper & Brass Inc., Rome, N. Y., have developed hand devices that automatically weld copper tubes to header sheets. Joints are so good that rejects are practically eliminated.

The guns use small pilots to center the device in the tube. Pulling the trigger on the gun starts a drill motor which turns a tungsten electrode around a prescribed circle. Both operate inside a container which keeps inert gas next to the heated area.

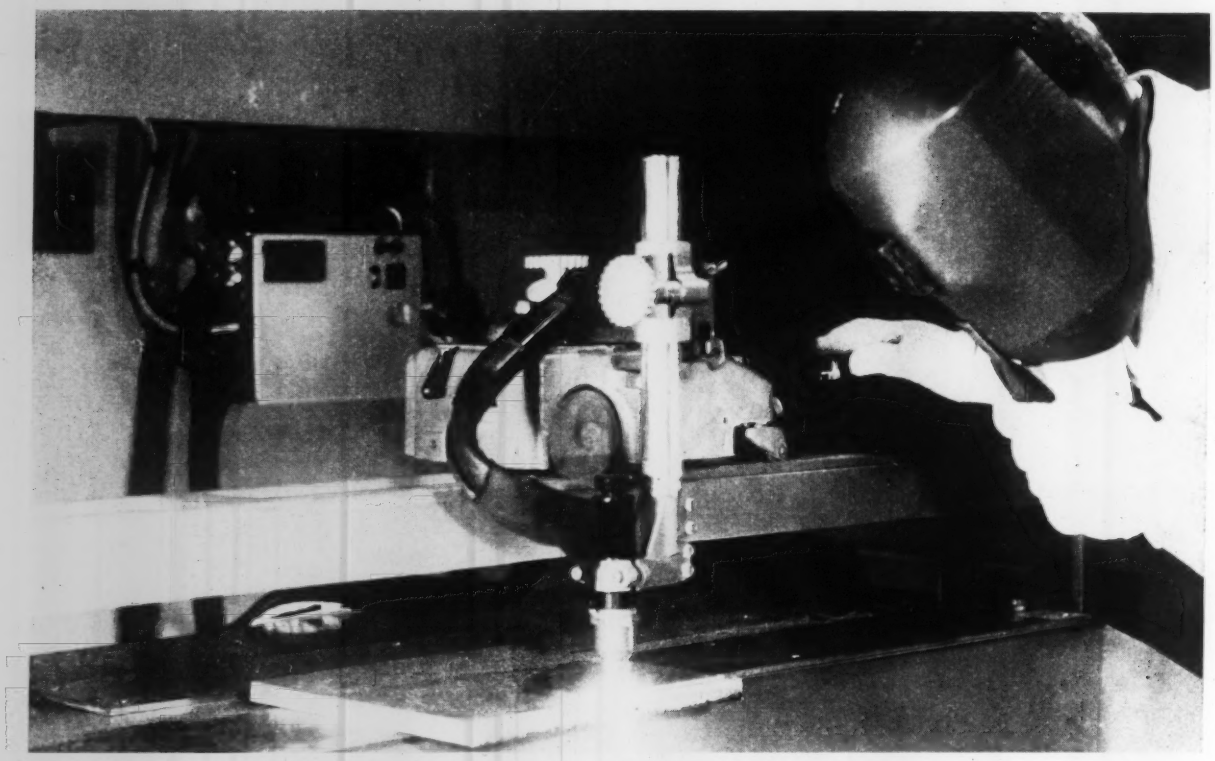
Other Areas

Rye, N. Y., has an eye-catching steeple that looks like imported Italian stained glass. It's made of glazed copper.

Harry Frolic, plant superintendent, Seaporcel Metals Inc., Long Island City, N. Y., says the steeple has been up for a year.

No sign of checking or deterioration has appeared, Mr. Frolic reports.

Seaporcel started with 16-gage copper (¾ hard) laminated to an aluminum honeycomb. Clear glass was applied first, then sprinkled with glazes of varying hues. After firing at 1500° F, the material has more color than stained glass. The



HELIARC CUTTING of copper is getting a lot of attention. Method uses 28,000° F and a helium-argon mixture. Jet action melts and removes a thin kerf, leaves a high-quality edge

COPPER

red copper shining beneath the glaze imparts great depth.

The treatment illustrates the great artistic value of copper as a decorative base. (Cost: About $10 a square foot, which is competitive with more traditional artistic techniques.

• **Neither Fish Nor Fowl**—H. M. Oshry, vice president, Steel Industries Inc., Crawfordsville, Ind., combines cold heading and cold extrusion in a new process to produce copper bases for power transistors. Mr. Oshry's process starts with a slug. The secret, says Mr. Oshry, is to push the metal under extremely high pressures. They make it possible to cold form oddly shaped parts with design ratios that are wrong for cold heading.

• **Trend**—Revere is one of the largest producers of foil. Major use: Printed circuits and coilmaking.

Coils of all types have traditionally been wire wound. Since enameling (insulation) must cover all sides, there are two thicknesses between turns.

Many coils are made with tape produced from foil which is insulated on only one side. Tape offers more heat radiating and electricity carrying capacity. The result is a lighter, more efficient package.

An outgrowth of this switch is the flexible printed circuit. Sanders Associates, Nashua, N. H., makes three versions: 1. Single layers of straight or curved conductors sandwiched between insulation. 2. Several layers of number 1, some of which can be interconnected. 3. Standard, flexible printed boards.

At least one auto firm is trying the idea. Airplanes offer myriad possibilities. Another possibility: Printed circuits for telephones.

Forging

STEEL was told that die pressed forgings are filling a need for high strength, unusually intricate copper parts.

For example, Wyman Gordon Co., Worcester, Mass., makes a 5½-ton pure copper forging on its 50,000 ton forging press. It is for one of our large missiles.

The part is made from an ingot that is the ultimate in quality. Closed die blocks are about the largest ever made (35 tons each). The finished part is about 5½ ft in diameter, weighs 1 ton. Tolerances are within 0.003 in.

• **Powders** — Copper has figured prominently in metal powder technology. One of the latest advances is copper strip. E. W. Bliss Co., Canton, Ohio, which developed the method (STEEL, Sept. 8, p. 114).

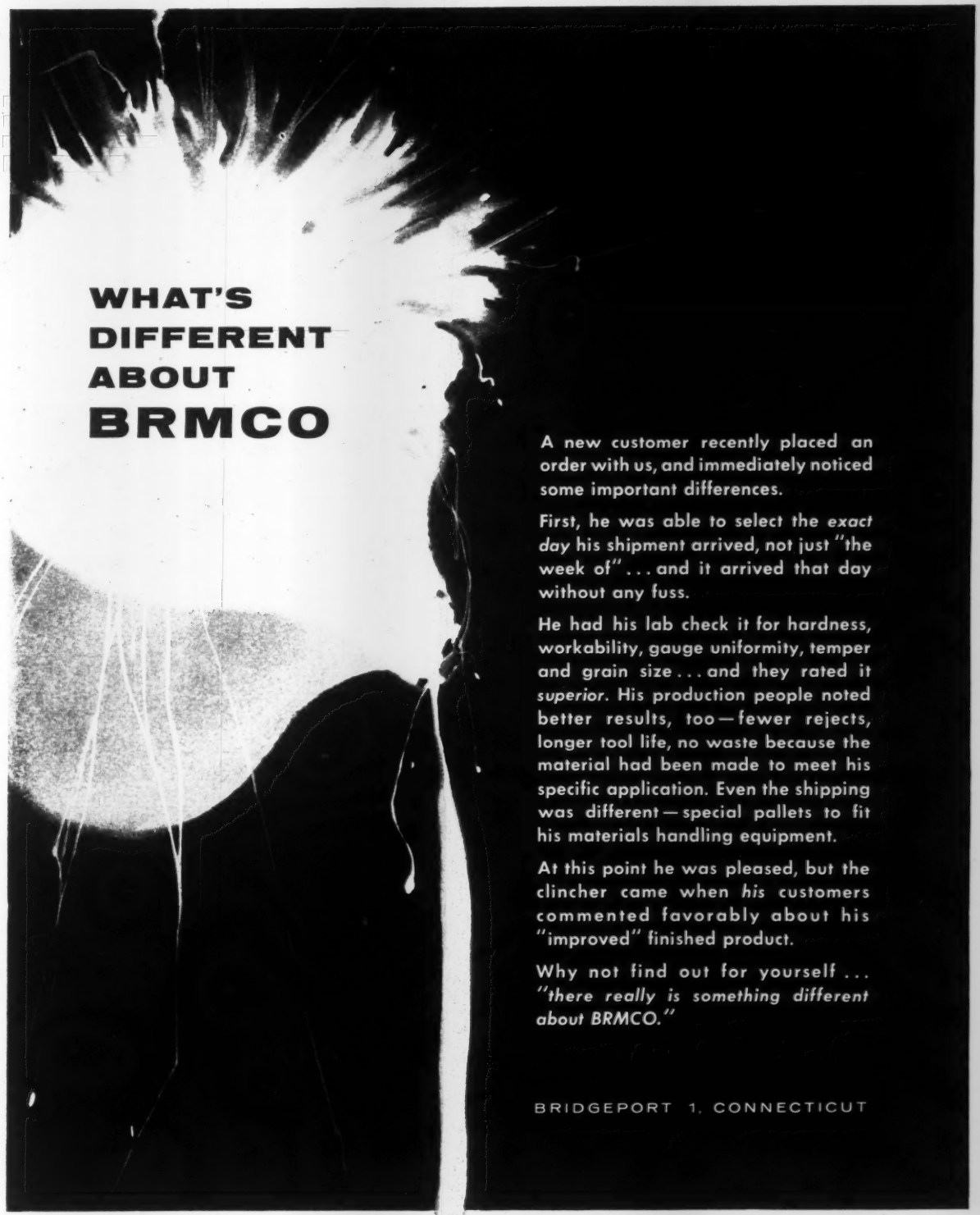
1. Such strip can be made for 80 per cent less.

2. It is 5000 psi stronger than electrolytic strip.

3. There are no edge cracks.

Wrapup

Because this report has been tailored to the needs of our busy readers, we could cover only the high points, but we think that no one could escape this conclusion: For a metal that's 8000 years old, copper still has plenty of life left in it.



WHAT'S DIFFERENT ABOUT BRMCO

A new customer recently placed an order with us, and immediately noticed some important differences.

First, he was able to select the *exact day* his shipment arrived, not just "the week of" . . . and it arrived that day without any fuss.

He had his lab check it for hardness, workability, gauge uniformity, temper and grain size . . . and they rated it *superior*. His production people noted better results, too—fewer rejects, longer tool life, no waste because the material had been made to meet his specific application. Even the shipping was different—special pallets to fit his materials handling equipment.

At this point he was pleased, but the clincher came when *his* customers commented favorably about his "improved" finished product.

Why not find out for yourself . . . *"there really is something different about BRMCO."*

BRIDGEPORT 1, CONNECTICUT

BRIDGEPORT ROLLING BRMCO MILLS COMPANY

A SUBSIDIARY OF ATLANTIC COAST INDUSTRIES, INC.

FINE QUALITY ALUMINUM, BRASS AND BRONZE IN STRIP AND ROLLS

THE JOB: Increase rate of production of syncro housings

OLD METHOD

Stress relief
Centerless grind
Degrease
Mill slot
Degrease
Drill four holes
Degrease
Countersink four holes
Tap four holes
Degrease
Thread OD flange
Deburr thread & slot
Degrease
Bore, turn & face
Deburr slot
Degrease
Tumble
Anodize
Inspect

NEW METHOD

Stress relief
Centerless grind
Drill, countersink, tap four holes & mill slot
Thread OD flange & deburr slot
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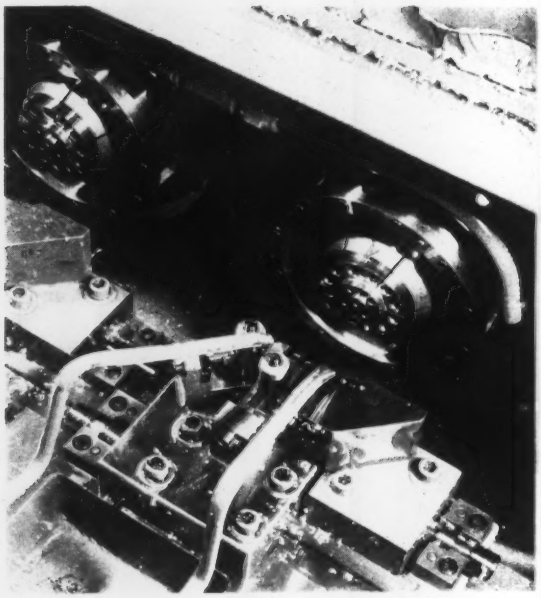


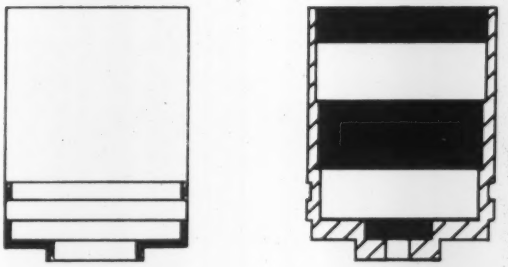
How We Beat the Cost Crisis

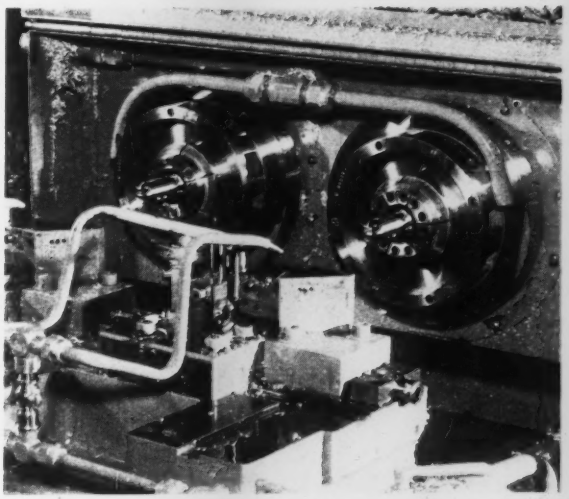
New Equipment Saves $17,589 a Month

Management wanted production costs cut in half. Here's how this firm exceeded that goal. The article is one of the top entries in the Cost Crisis Awards Competition. Another will be published next week.

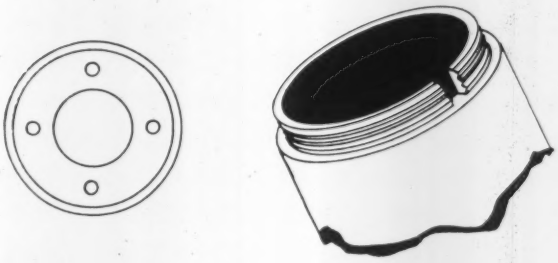
SYNCHRO housings are turned out at the rate of 40,000 a month at the Eclipse Pioneer Div., Bendix Aviation Corp., Teterboro, N. J.

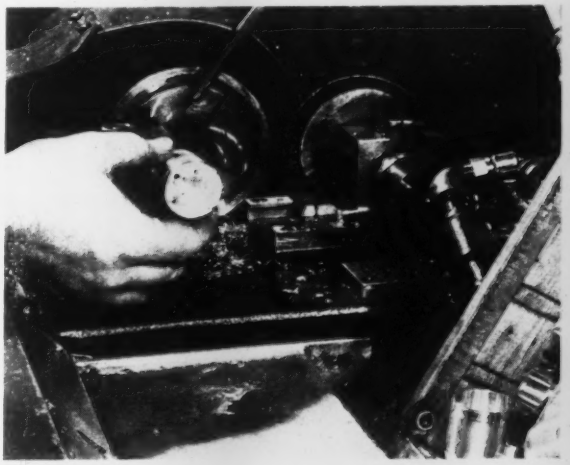
William J. Doerr, assistant factory manager, motor division, says this target was set: Maintain production rates, hold extremely close tolerances, and cut manufacturing costs in half. The problem was





New Bore-Matic turns two outside diameters, faces the part, and bores three inside diameters





Wisconsin special drills, countersinks, taps four holes, and mills slot. Wire brush on threading machine deburrs milled slot

turned over to a plant group consisting of representatives from tool design, production, and time study.

Solution — Three pieces of new equipment were added.

First, the centerless grinder was modified—automatic size compensation was installed. A feed chute was added to make the operation automatic. Quality was maintained, and production rates of the operation jumped 166 per cent.

Second, a Wisconsin special automatic machine was added to the line. In one cycle, it does the work that used to require four separate hole and slot operations. Production rates for these four jobs are 500 per cent above the old rates.

Third, a special, double-spindle Heald Bore-Matic bores three diameters, turns two others, and finish machines a face. This operation has been speeded up 367 per cent.

Eclipse engineers also came up with the idea of incorporating an automatic wire brush attachment on the threading machine. It lets them deburr a milled slot, eliminating a separate operation.

Roller helper William R. Boyack operates control panel of self-regulating system

Electronics Regulates Strip Mill

Control varies rolling pressures and speeds to compensate for uneven cooling. Benefits include higher quality steel products and increased yields

PROBLEM: Red hot pieces of steel —preheated to about 2300° F—do not always retain uniform heat during the rolling process. The cooler, harder portions of the metal offer more resistance to rolling than the hotter, softer areas. Additional rolling pressure or other compensation is required to prevent nonuniform thickness.

Solution: Install gages to measure the rolling pressures of the steel being processed; translate gage readings into electrical signals; and feed these signals to electrical control systems which regulate settings.

Such an application of electronics has just gone into operation at the Geneva (Utah) Works of Columbia-Geneva Steel Div., U. S. Steel Corp.

The self-regulating system is expected to increase yields and will insure higher quality products.

New Pressure Gages—Finishing stands, consisting of six complete rolling mills operating in tandem, are equipped with pressure gages designed and built in Sweden for U. S. Steel Corp. The gages are the largest of their kind ever built by ASEA Electric Inc.

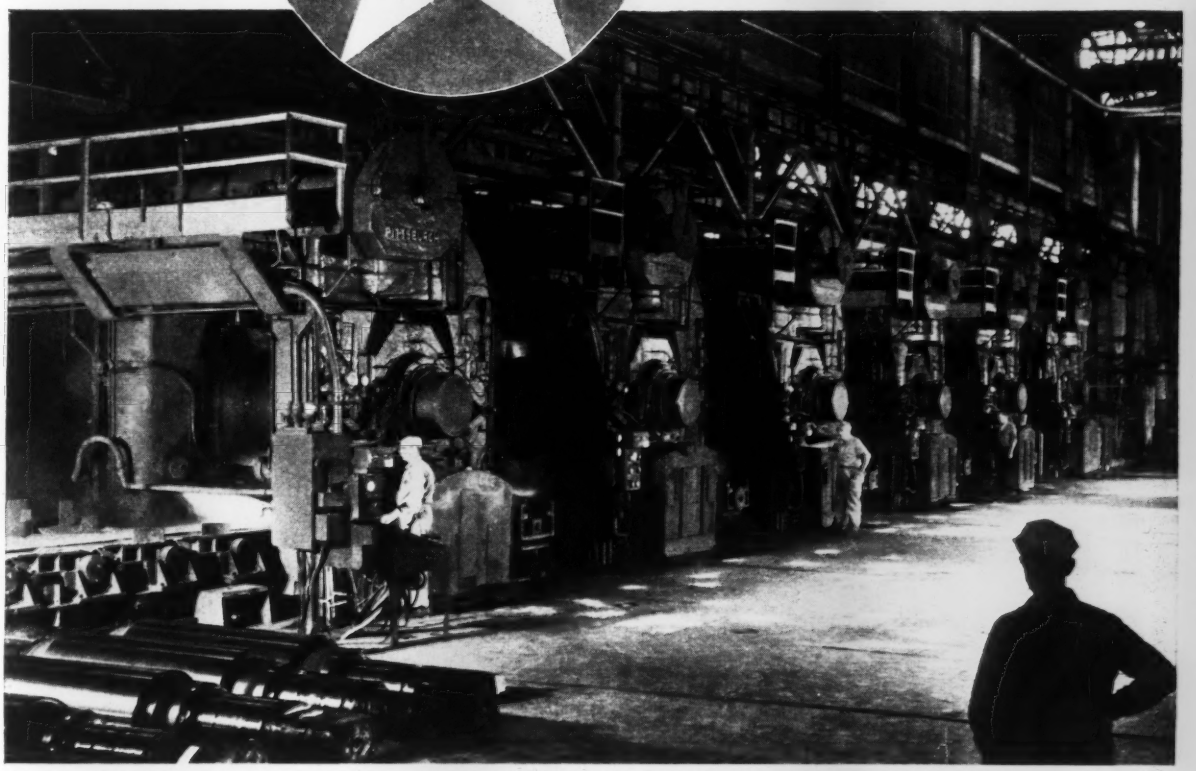
George S. Koss, assistant division superintendent of rolling mills, and Louis E. Ringger, assistant works engineer, devised the control technique.

Electronic Control Center—Electrical impulses from pressure gages actuate electrical control systems which change the pressure and speed of the rolling mills.

The control equipment was developed and built by General Electric Co. from specifications drawn up at Geneva. Applied research personnel of U. S. Steel Corp. assisted in the development and analytical work required to complete the final design. The equipment was installed by Geneva maintenance crews.

54" HOT STRIP MILL

by Pittsburgh



featuring **DIRECT DRIVE** *to* **ALL SIX STANDS**

For the first time anywhere a 54" hot strip mill with direct drive to all mill stands has been built at the Portsmouth plant of Detroit Steel Corporation. This design eliminates the conventional large gear drive which is expensive to install, costly to maintain, less efficient in operation, and requires more space. Pittsburgh Engineering and Machine Division designed, fabricated and erected this entire mill with its many outstanding features.

We invite your inquiries for all types of rolling mills and auxiliary equipment.

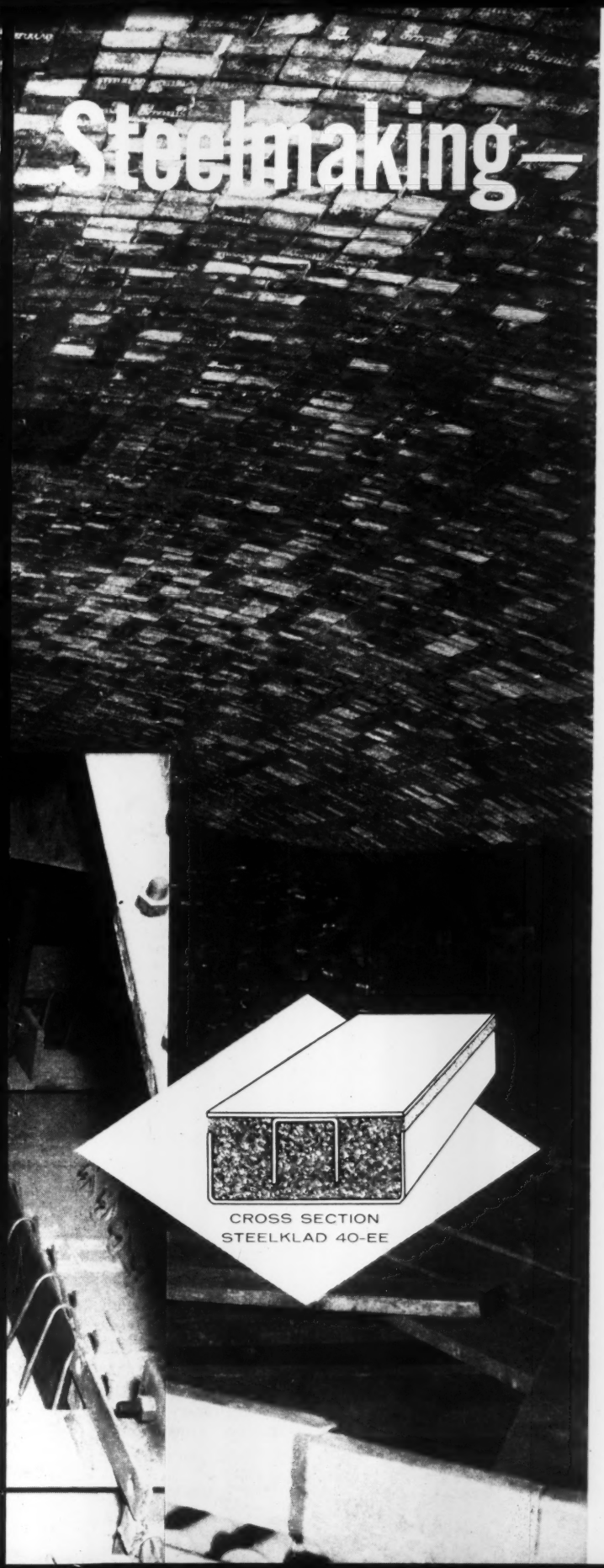
"Electric and open hearth steel castings from 1 lb. to 100 tons"

Pittsburgh
ENGINEERING
& MACHINE DIV.

Division of Pittsburgh Steel Foundry Corporation
P. O. BOX 986, PITTSBURGH 30, PENNSYLVANIA
PLANT AT GLASSPORT, PENNSYLVANIA

GENERAL REFRACTORIES

Breakthrough in



GREFCO'S
STEELKLAD 40-EE

the roof of the "All-Basic" open hearth furnaces now breaking production records.

• This year, improved operating techniques and greater use of oxygen in open hearth furnaces have yielded unprecedented increases in production. Two years ago, a production rate of 25 ingot tons per hour was considered satisfactory for large open hearths. Today, many of these same furnaces produce 40 tons per hour, and rates up to 50 tons per hour are deemed entirely possible.

These improvements, however, place such increased stress on roof refractories that silica brick cannot endure. Only "All-Basic" furnaces can withstand these operations satisfactorily.

"STEELKLAD 40-EE", the first internally plated brick, has made possible the phenomenal growth in the number of "All-Basic" furnaces. In early 1956, only two "All-Basic" furnaces existed in North America. By January of this year, there were 15. At present, over 50 furnaces are or will shortly be of "All-Basic" construction. And of this total, more than 80% have roofs of "STEELKLAD 40-EE" refractory brick.

• *GREFCO leads the Refractories Industry in "All-Basic" furnaces, with radically new "EE" and "Tab" brick.*

• *Simplified basic constructions, using "Tab" and "EE", drastically cut "All-Basic" furnace costs.*

• *GREFCO technical and sales service personnel are ready to help you build such furnaces, whether of sprung, suspended, or combination roof construction.*

For basic brick tailored to your installation, and for the know-how and experience to use them properly . . . Get GREFCO!

GENERAL REFRACTORIES COMPANY

Philadelphia 2, Pa.

A COMPLETE REFRACTORIES SERVICE

(*At left*) A new roof of "STEELKLAD 40-EE" converts this open hearth furnace to "All-Basic" construction, and permits vastly increased production, at lower cost.

Limits Spur Gage Search

That elusive millionth of an inch continues to challenge both users and builders of machines and gages. Seminars point up the problem and help look for answers

INCREASING DEMANDS for closer tolerances and high reliability (underscored by missilemakers) are sending component makers and machine tool builders on a search for better measuring methods.

Federal Products Corp., Providence, R. I., is expediting the search with industry seminars on procedures and equipment to be used in design, machining, process control, and gaging. Goal: Find ways to get the necessary precision at the lowest cost.

About 30 production supervisors, methods engineers, tool and gage engineers, chief inspectors, and quality control managers attend each seminar. One is held about every six weeks.

Problems—C. W. Kennedy, Federal's manager of training, asserts: "Many new gaging tools are electrically directed and depend on exact response of mechanical parts. Often, looseness or play exceeding a few millionths cannot be tolerated."

This problem of measuring the always-elusive millionth of an inch is brought into focus by J. K. Emery, chief engineer, Van Keuren Co., Watertown, Mass.:

"When we think of size in millionths, familiar metals like steel and aluminum exhibit unfamiliar tendencies. Measuring in thousandths or ten thousandths was accomplished on apparently solid, unyielding material. The same metals are rubbery, with unstable characteristics, when we search for the millionth of an inch. The approach of an operator's hand, warmth of an overhead light, a stray current from a distant door, will cause the material to rise or fall like an undecided tide. At what moment shall we give the size a number?"

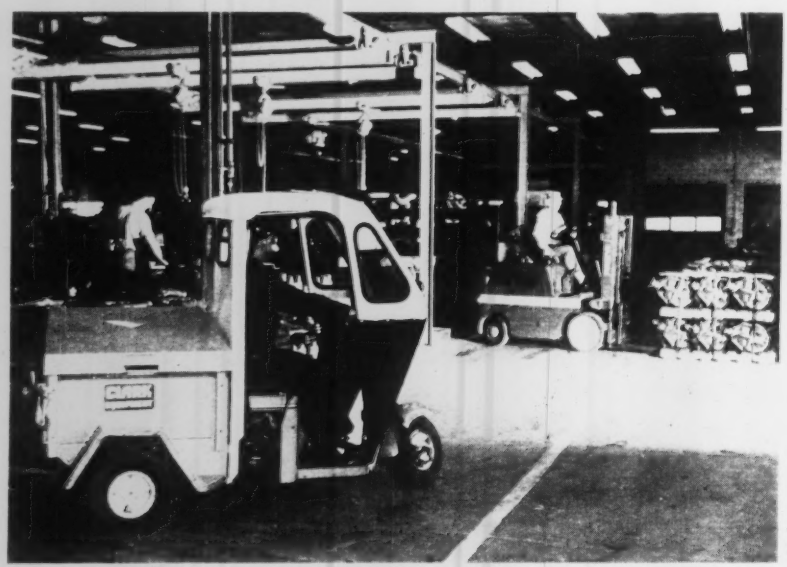
And yet the importance of maintaining millionth tolerances is almost commonplace in missilemaking. Mr. Emery points out that, "In one stage of assembly, two parts must fit together, under heat, with as little as five millionths loose fit. One shaft must slide equally well into six mating components, and inspection must record and code these parts. Five parts, all within a ten thousandth of each other, could be in five different assembly categories.

"Accuracies of measurement at the machining stage and immediately prior to assembly must be well within ten millionths and must be correlated."

Search — An inspection methods team from Mr. Emery's plant took ring gages and round samples (both steel and Invar) to a variety of plants with precision gaging capabilities. The results of the checks made on identical ring and round parts showed a lack of uniformity "difficult to accept." The survey showed that absolute measurement to the millionth of an inch cannot be achieved with present equipment, says Mr. Emery.

Purpose—Federal's seminars are designed to whip this problem. The first step in its solution is to realize the problem exists, and to understand it.

The second step is to examine problems, available equipment, and gaging methods. That's where the seminars come in.



THIS ENCLOSED ONE-SEATER saves Clark Equipment Co., Chicago, $35,000 each year in salaries. Ten plant protection men can cover the same ground 17 did formerly. One run makes 71 key stops through 700,000 sq ft in 20 buildings. Gas cost: $30 a month

Building Block Gains

All is not quiet on the building block concept. Ford Motor Co., a prime mover in working to establish it in machine tool building, reports "widespread support" from many manufacturing firms.

Henry C. Daum, manager of Ford's machining process department, says 15 companies (with both high and low volume production problems) have endorsed the concept.

Some machine tool builders have O.K.'d the building block idea, others have not. Best bet, however, is that the concept will become a reality. Machine tool builders will be handed this choice by some prime customers: Bid according to the new specifications, or lose the business.

4 REASONS FOR SANDVIK'S SUCCESS in Spring Steel applications like these

- *Special Physical Properties*
- *Fine Surface Finish*
- *Accurate and Uniform Gauge*
- *High Fatigue Life*

SANDVIK Swedish Specialty Strip Steels are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical instruments, etc. • Razor Blades • Reeds • Shock Absorbers • A Wide Variety of Springs • Trowels • Vibrator Reeds • Piston Ring Segment and Expanders, etc.

The partial list of Sandvik applications shown below is, in itself, good evidence of Sandvik steel's quality. In every case, Sandvik's performance is vitally important.

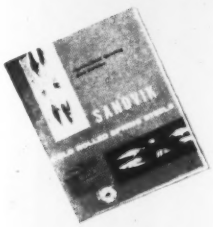
If you have an application where spring steel performance is important, check with SANDVIK. There's a good chance you'll find a SANDVIK steel that will suit your requirements exactly.

SANDVIK cold-rolled high carbon strip steel is available:

- Precision-rolled in thicknesses to fit your requirements.
- In straight carbon and alloy grades.
- In special analyses for specific applications.
- Annealed, unannealed or hardened and tempered.
- Polished bright, yellow or blue.
- With square, round or dressed edges.

Ask your nearest Sandvik office for further information or technical assistance.

SS-88



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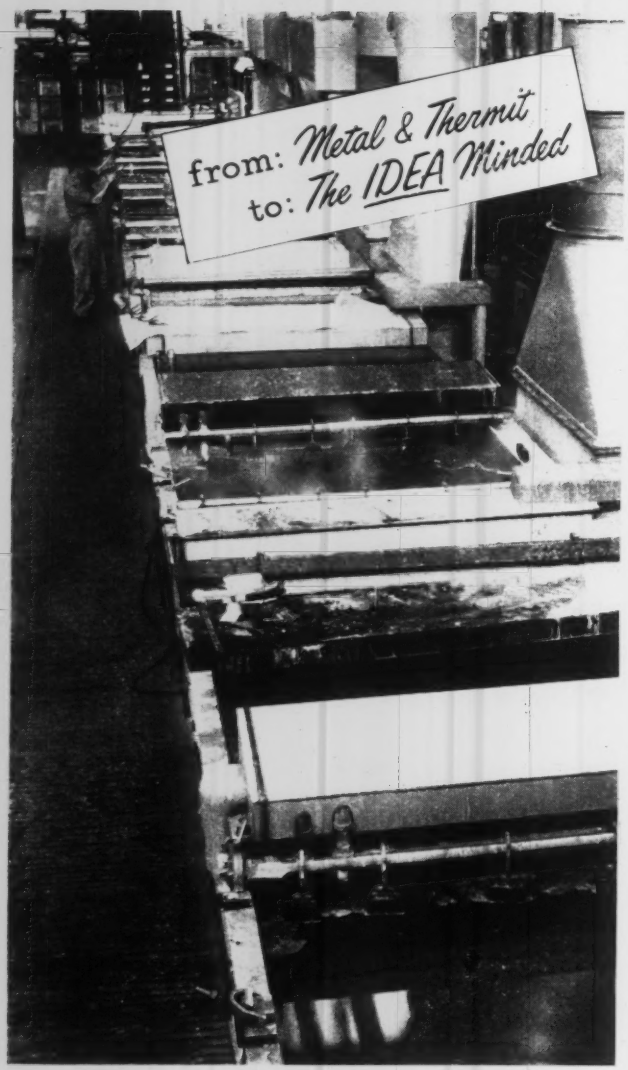
Sandvik Quality Steels



"Lifetime" protection for inaccessible tank surfaces

Shown here are a few of the more than *1000* metal finishing tanks in a well known aircraft plant that have been coated inside and out with vinyl Unichrome "Super 5300" Plastisol.

Their exteriors are coated to protect against spillage of corrosive acid and alkaline cleaning and plating solutions, especially on areas inaccessible to maintenance when the tanks are installed close together. Thus, corrosion from the outside is blocked just as effectively as the lining stops it from the inside.

Applying "Super 5300" Coating costs less than most sheet linings. Sprayed on, it conforms without seams, pores or air pockets to irregular surfaces. Send for Bulletin SP-1.

Hurricane-proof building has ALL-welded construction

The 20-story First National Bank of Miami will have its steel skeleton completely welded . . . sub-assemblies as well as field connections.

In shop fabrication and erection, the welding cuts construction time, decreases costs, fully satisfies engineering strength requirements for this hurricane area. Allied Structural Steel Company, the shop fabricator, relies on M&T's Murex electrodes for strong, dependable welds coupled with speed and economy.

Send for Bulletin ESC on the M&T line of electrodes for all welding needs.

Better chromium for the new models

Already used by one car manufacturer, a new chromium plating process promises to put an end to pitted and rusted auto brightwork. Till now, *all* decorative chromium plate contained unavoidable pores and minute cracks that permitted corrosives to attack base metal (bottom). But new Unichrome Bright Crack-Free Chromium plates without cracking, and eliminates pores by permitting up to 10 times the thickness of ordinary decorative chrome plate. Result: trim that *stays* like new (top).

METAL & THERMIT
CORPORATION

GENERAL OFFICES: RAHWAY, NEW JERSEY
Pittsburgh • Atlanta • Detroit • E. Chicago • Los Angeles
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.

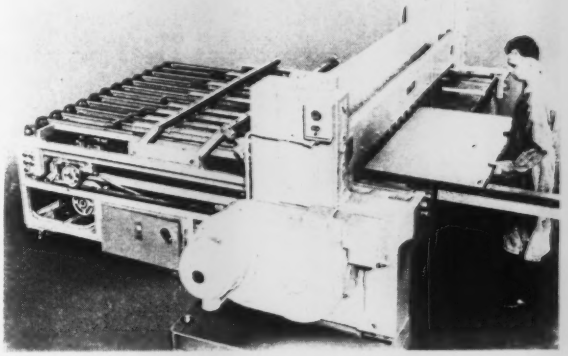
Unit Gages and Feeds Stock from Shear

The high speed Shear-Pacer accurately gages and feeds sheet, coil, or strip stock from standard square shears for automatic trim or cutoff operations.

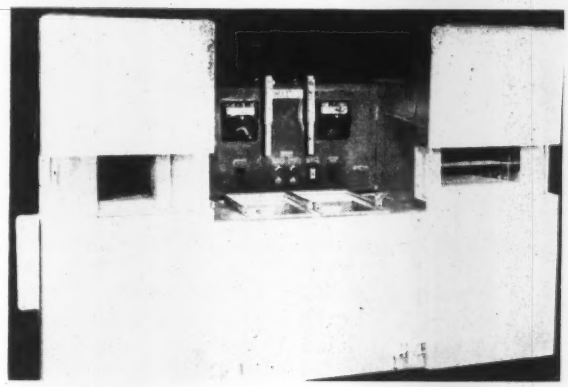
Mounted at the rear of the shear, the unit's electrical control system is integrated with that of the shear.

It automatically advances the sheet to gaging fingers, operates the shear, and carries the trimmed sheet to a stacker unit. The stock feed rate is adjustable from 80 to 300 fpm.

Two strips of varying thickness can be handled simultaneously. A visual measuring device with a lead-screw control adjusts and sets the length of cut. *Write*: Press Automation Systems Inc., 25418 Ryan Rd., Centerline, Mich. *Phone*: Jefferson 9-7750



Improved Heat Treating Furnace Has Double Oven



The Model CH heat treating furnace is equipped with electronic automatic control instruments and electrically operated control valves. It handles all types of water and oil hardening steels.

Designed to fit in a limited floor space, the furnace still provides the advantages of full scale heat treating. The heating furnace has a temperature range of 1000 to 2400° F; the tempering oven, 250 to 1100° F.

It can also be used for annealing, normalizing, pack hardening, and stress relieving. An electric furnace is available (Model EH).

Operators need little skill to produce required results. *Write*: Dept. 9, Waltz Furnace Co., 1901 Symmes St., Cincinnati 6, Ohio. *Phone*: Capitol 1-2444

Reliable Industrial Counter Is Transistorized

This transistorized preset counter has been designed for highly accurate industrial counting and control functions. A high degree of reliability is reported because there is virtually nothing to wear out.

Direct readout is available through Nixie in-line neon tubes which continuously display illuminated numbers on separate tube faces readable from 50 ft.

Counting and control applications range from length measuring and cutoff operations to automatic batching and packaging.

The device can be readily adapted to operate readout devices. Preset range is 0 to above 180,000 counts a minute with intantaneous reset; totalizing speed is 0 to 300,000 counts a minute. *Write*: Dynapar Corp., 5150 Church St., Skokie, Ill. *Phone*: Orchard 4-6655

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Looking for the world's most complete stock of 52100 steel tubes and bars? You've come to the right spot . . . . . .

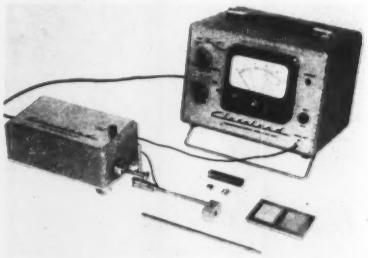
PETERSON STEELS, INC.
Union, New Jersey
Detroit, Michigan Chicago, Illinois

NEW PRODUCTS and equipment

Unit Measures Roughness

A wide range of surface shapes can be measured with the Roughness Meter's basic equipment: Outside diameters down to 0.030 in., and inside diameters as low as 0.25 in.

The basic unit consists of pickup, amplifier, and handle. It may be held by hand or operated with a power trace. Readings are not affected by temperature, humidity, or magnetic fields.

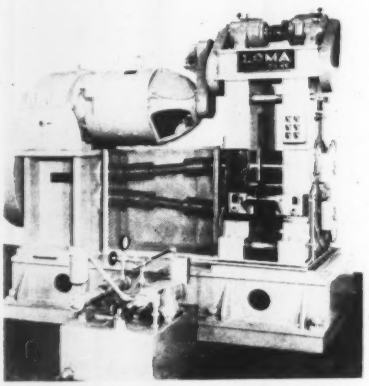


The unit's precision calibration and construction exceeds all military and industrial standards. *Write*: Cleveland Instrument Co., 735 Carnegie Ave., Cleveland, Ohio. *Phone*: Prospect 1-7070

Mill Is Convertible

This heavy duty, precision 2-high/4-high combination rolling mill is intended for metallurgical production and research. It can be converted from a conventional vertical strip mill to a horizontal mill for compacting of metal powders into sheets and strip.

The machine is equipped with extralarge capacity housings, roll journals, universal spindles, and drive transmission, allowing reduc-



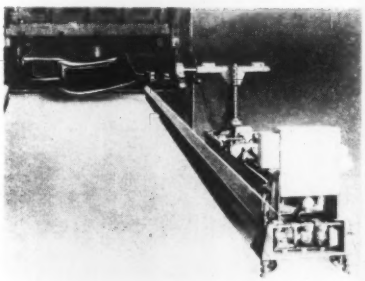
tions of more than 50 per cent per pass while maintaining tolerances as close as 5 per cent of thickness.

Changeover from 2-high to 4-high requires 30 minutes. *Write*: Loma Machine Mfg. Co. Inc., 114 E. 32nd St., New York 16, N. Y. *Phone*: Murray Hill 5-6410

Extractor Saves Time

This portable and self-contained Press-Hand extractor is adaptable to many production machines and readily timed to production cycles.

The unit is a versatile time saver that eliminates costly and hazardous manual operations.



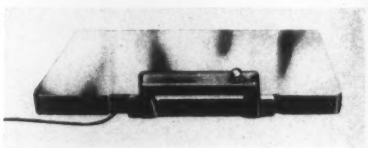
It can be used to lead, transfer, or remove materials from punch or forging presses, and diecasting machines. With a shovel unloader, it can be used to strip parts from the top half of a die. *Write*: Die & Automation Inc., 5353 Dixie Highway, Hamilton, Ohio. *Phone*: Twinbrook 2-4581

Plate Floats Heavy Work

The Model C "Floating Plate" allows heavy jigs and parts to be moved easily across horizontal surfaces with light pressure. A cushion of air keeps the plate a few thousandths of an inch above the surface.

Escaping air from the sides of the plate keeps the surface free of chips in the path of movement.

A major application of the plate is moving heavy drill jigs on multiple-spindle drill presses. *Write*: Centerline Engineering Co., 90 Crest St., Wethersfield, Conn. *Phone*: Jackson 9-6721



Cleaner Strength Checked

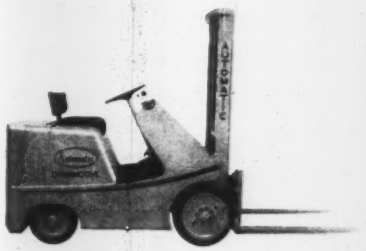
Use of the Cleaner Control Kit to measure strength of cleaner solution requires no chemical knowledge. Measurement can be made in 30 seconds.

The results are calibrated so that the number of ounces of cleaner per gallon of solution can be read directly.

Sensitivity affords accuracy for all practical purposes, and all equipment is packaged in a single box. *Write*: Hanson-Van Winkle-Munning Co., Church Street, Matawan, N. J. *Phone*: Matawan 1-1000

Truck Is Gas-Electric

The gas engine on Dynamotive fork lift trucks transmits power through a variable voltage generator to a matched electric drive motor, forming a synchronized power package.



This arrangement enables the gas engine to operate at its most efficient speed at all times, resulting in fuel savings.

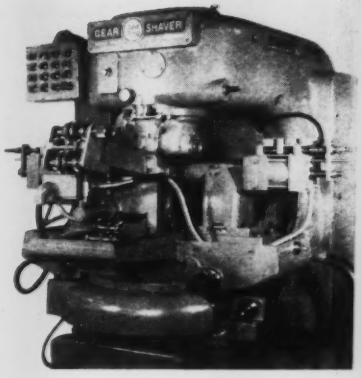
Capacity of the Dynamotive trucks ranges from 4000 to 10,000 lb with lifting heights to suit all applications. *Write*: Automatic Transportation Co., division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill. *Phone*: Radcliffe 3-7000

Loader Gages Gears

A Red Ring automatic loader that handles cluster-type gears on rotary gear shaving machines can take four setups on a single part.

The input size gaging function in the loader is provided by passing the gear between a pair of master gears.

The rocker-type loader removes a gear from an input magazine and positions it for shaving. *Write*: National Broach & Machine Co., 5600 St. Jean, Detroit 13, Mich. *Phone*: Walnut 1-8980



Coating Inhibits Rust

An aluminum pigmented liquid coating with potent rust inhibitors provides long term protection against rust and corrosion under severe exposures in marine and industrial atmospheres.

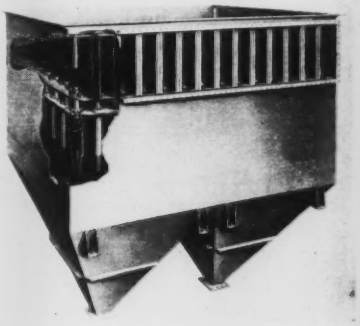
Metalcoat-A can be applied to rough or polished surfaces that do not have to be entirely rust-free. It is not affected by temperature changes.

Application can be made by brush, roller, spray, or by dipping. *Write*: Dept. DM, Gulf Oil Corp., P.O. Box 1166, Pittsburgh 30, Pa. *Phone*: Express 1-2400

Dust Collector Revamped

Two designs of the Cyclo-trell, multiple tube, mechanical dust collector have been announced. They are used to clean gases from boilers, dryers, calciners, smelters, kilns, and other sources.

One provides for horizontal entry of uncleaned gases through a side inlet with cleaned gases passing

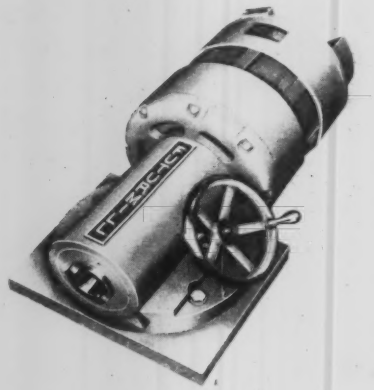


through a universal outlet. In the second design (shown) the uncleaned gas enters at the top and leaves through the side.

Both designs are available in various capacities. *Write*: Research-Cottrell Inc., Bound Brook, N. J. *Phone*: Elliot 6-2600

Spindle Converts Planers

These 50 hp, geared milling spindles convert planers or other machines into high production milling machines. They have speeds from 225 to 1200 rpm.



Powered by Class B insulation 70° rise motors, the spindles are designed for high cubic inch metal removal per horsepower on mild steel, cast iron, stainless, and other high heat resistant steels.

A standard No. 50 NMTB spindle nose permits rapid change of cutters. *Write*: Futurmill Inc., 6360 Highland Rd., Pontiac, Mich. *Phone*: Orlando 3-1267

Resin Insulates Stators

By casting open-type motor stators in an epoxy resin, complete protection for the insulation system is obtained.

The winding end turns are enclosed in a hard, protective case, making them impervious to moisture and resistant to attack by solvents, oils, and the most commonly encountered chemicals.

Slot portions are filled by the resin and provide them with the same protection. *Write*: Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. *Phone*: Spring 4-3600

Severe Load Lubrication

Suspension "10" colloidal graphite in oil has been developed for high temperature, severe load industrial lubrication.

Uses include glass mold lubrication; ferrous and nonferrous forging and diecasting; forming, stamping, and drawing aluminum and titanium; an oil additive for internal combustion engines; and lubricant for conveyors and chains.

It is suited for exacting and close tolerance applications. *Write*: Joseph Dixon Crucible Co., Jersey City 3, N. J. *Phone*: Delaware 3-3000

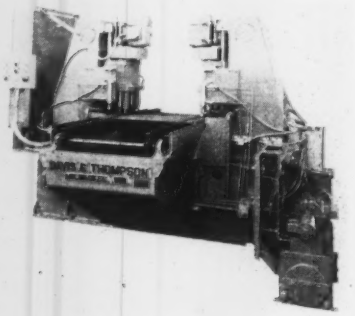
Removes Welding Stains

Chemclean No. 536 removes from stainless steel burns and stains caused by welding. It will also brighten the metal.

Acid in nature, the liquid is extremely effective on the 300 series of stainless. *Write*: Chemclean Products Corp., 610 Warren St., Brooklyn 17, N. Y. *Phone*: Main 5-1340

Transfer Unit Adaptable

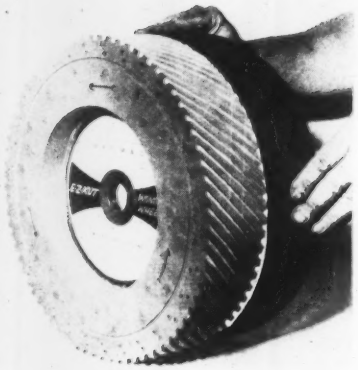
This transfer machine automatically takes work progressively through a preset cycle on a hydraulically indexing conveyor chain. Although the machine shown chamfers bosses of tierods, it is adaptable to a wide range of operations.



The production rate in this instance is 666 parts an hour. *Write*: Davis & Thompson Co., 4460 N. 124th St., Milwaukee 18, Wis. *Phone*: Hopkins 6-3350

Wheel Eliminates Idler

This expanding grinding and polishing wheel is made of rubber



and uses coated abrasive bands. The wheel eliminates the need for backstand idlers in the use of coated abrasives.

A band is fitted loosely, and when the wheel is brought to operating speed, centrifugal force causes it to expand and grip the band.

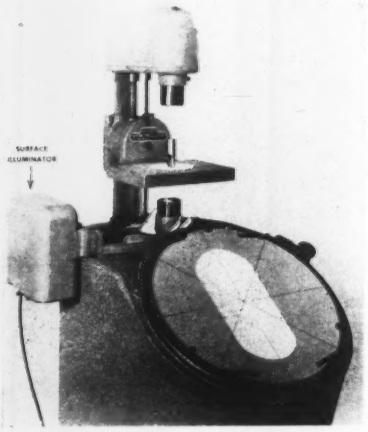
It is offered as replacement for contact, setup, and bonded grinding wheels. *Write*: Mermac Products Inc., 1144 S. Kostner, Chicago 24, Ill. *Phone*: Nevada 8-3031

Surface Light Reflected

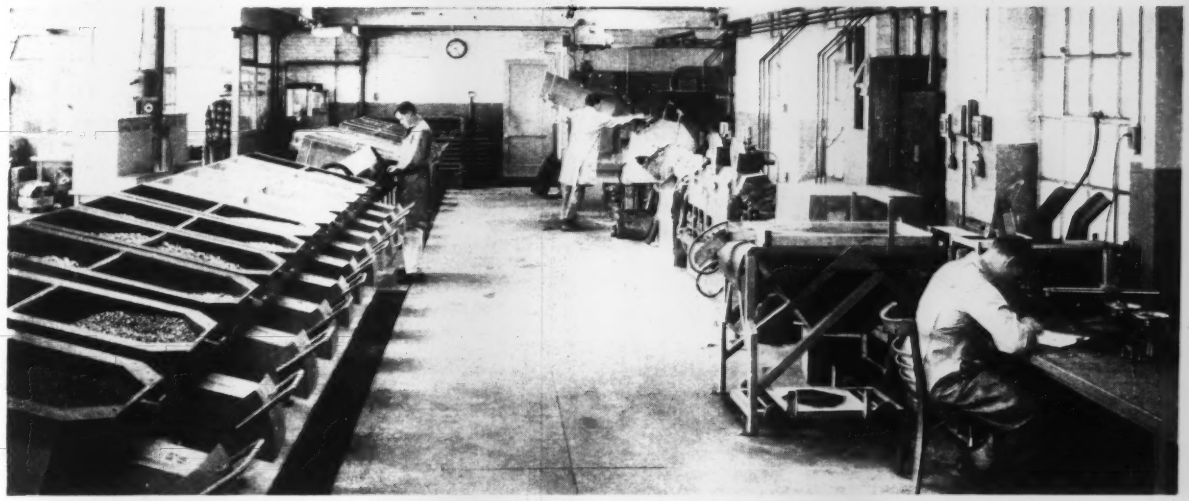
A surface illuminator can be used for all standard magnifications (10 to 100 X) on the Micro-Projector.

Whenever a design or contour has to be picked up against an opaque background, projection by shadow image is not feasible. Such cases require projection by reflected light.

This unit uses a 500-watt standard projection bulb, providing a distinct image. Colors are faithfully reproduced. *Write*: George Scheer Co., 200 Lafayette St., New York 12, N. Y.

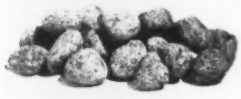


Now's the time...here's the place



The big Norton Sample Processing Department solves your finishing problems with a wide variety of tumbling equipment . . . and the right abrasive to do the job.

to find the tumbling abrasive you need



ALUNDUM* TUMBLEX* "A" Abrasive. For general barrel finishing. Removes flash, scale, tool marks and burrs, while forming radii and finishes to required micro-inches. Seventeen sizes.

ALUNDUM TUMBLEX "T" Abrasive. Bonded, triangular and fast-cutting for special shaped parts. They won't wedge in work slots or holes. Four sizes.

ALUNDUM TUMBLEX "S" Abrasive. Bonded spheres that get into areas where other shapes can't reach. Exceptionally dense and long lasting. Five sizes.

TUMBLEX "N" Abrasive. Natural stones, exclusively Norton. For high lustre, especially on die castings and soft metal. Rounded shape brings up highest lustre. Seven sizes.

G-341

If you're still finishing metal parts the long, hard way, now's the ideal time to find the fastest, most effective barrel finishing equipment, methods and abrasives.

For example, one leading aircraft parts manufacturer reports saving over $90,000 yearly by shifting from hand-finishing to barrel finishing with Norton TUMBLEX abrasives.

There's one sure way for you, too, to get these cost-cutting, product-improving "Touch of Gold" advantages. Your metal parts can range from tiny needles to hefty forgings . . . may be simple or complicated, hard metals or soft . . . may require deburring, descaling, better color and closer finish. Just send sample parts to our Sample Processing Department. They'll be returned to you completely finished to requirements, with a detailed report. Or, next time you're in our area, drop in and learn how your finishing can be improved.

NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

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NORTON

ABRASIVES

Making better products... to make your products better

NORTON PRODUCTS

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Refractories

BEHR-MANNING DIVISION
Coated Abrasives • Sharpening Stones
Pressure-Sensitive Tapes

NEW literature

Write directly to the company for a copy

Extrusion Presses

Bulletin No. 50 carries material on extrusion presses and processing machines for all metals. Sutton Engineering Co., First National Bank Bldg., Pittsburgh 22, Pa.

Truck Batteries

Details on the complete line of premium Slyver-Clad truck batteries are to be found in Bulletin IT-528. C & D Batteries Inc., Washington and Cherry Streets, Conshohocken, Pa.

Diamond Wheels

A catalog covers metallic and resinoid bonded diamond grinding wheels. They are offered in all customary shapes and sizes for carbide grinding as well as custom wheels for special applications. Diacraft Inc., 26538 W. Seven Mile Rd., Detroit 40, Mich.

Filing Machine

A bulletin describes a machine for filing, trimming, and deburring a wide variety of small components. Newage Industries Inc., 222A York Rd., Jenkintown, Pa.

Helical Gear Drives

Folder 2651-A carries data on horsepower ratings, dimensions, mounting information, and a resume of construction principles applying to quadruple reduction speed reducers. Dept. PR, Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Thread-Roll Dies

A bulletin describes aircraft quality, thread-roll dies for production of external screw threads in fine and coarse series. Design features, reliability factor, application, and tolerances are discussed. A. W. Scott, Advertising Dept., Box 579, Standard Pressed Steel Co., Jenkintown, Pa.

Hand Traveling Cranes

Bulletin DH-468-A lists the lifting capacities, widths of spans, and specifications of the B-9 top running, single bridge, hand traveling crane. It is for industrial applications where accurate spotting is more important than fast travel speeds. Wright Hoist Div., American Chain & Cable Co. Inc., York, Pa.

Eccentric Geared Presses

Bulletin 66A presents the modernized Series SE straight side, single action, eccentric geared presses for large, heavy tonnage drawing, punching, and blanking. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Resistance Thermometers

Catalog EN-S4 provides information on Thermohm detectors (resistance thermometers) for temperatures up to 1000° F. Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Spotwelder Control

Bulletin 10-613 describes the counting tube type of precision control for tri-phase electric resistance spotwelders. It is particularly suited for direct current, rectifier type welders mechanically operated by air or hydraulic fluids. Taylor-Winfield Corp., Warren, Ohio.

Titanium Tubing and Pipe

Physical and mechanical properties, fabrication characteristics, and corrosion resistance of titanium tubing and pipe are described in this bulletin. Alloy Tube Div., Carpenter Steel Co., Union, N. J.

Voltage Regulators

Bulletin GEC-1450 describes the functions and operational concept of Inductrol voltage regulators. General Electric Co., 100 Woodlawn Ave., Pittsfield, Mass.

Wet Blasting

Bulletin 100 covers precision finishing by the wet blasting method. Efficient applications of the Liquamatte Model 43 are illustrated. Wheelabrator Corp., 1157 Avenue V, Vicksburg, Mich.

Drive Components

V-S drives for precise, adjustable machine speeds from in-plant alternating current circuits are covered in Bulletin D-2506. Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Milling Cutters

Bulletin No. 582 tells about the construction of Series 900 milling cutters using square and triangular throw-away carbide inserts. Covered are specials for unusual requirements. McCrosky Tool Corp., Meadville, Pa.

Wire Cutter and Stripper

A bulletin has been issued on a completely automatic, high speed wire cutter and stripper. A table gives information on production rates of up to 9000 pieces an hour and wire lengths up to 120 in. Jennings Machine Corp., 3452 Ludlow St., Philadelphia 4, Pa.

Wrought Iron Tubes

Installations in which the use of wrought iron and other metal tubing in the same equipment permits service life comparisons are cited in a booklet. Listed are cost figures for each material and the corrosive conditions to which the tubing was subjected. A. M. Byers Co., Box 1076, Pittsburgh 22, Pa.

Lighting Equipment

Industrial and other lighting equipment are illustrated in a price catalog. Luminous Ceilings Inc., 2500 W. North Ave., Chicago 47, Ill.

Flat-Rolled Metals

This handbook contains over 100 pages of practical technical data. Included are tolerance charts, AISI-SAE standards, steel chemical analysis specifications, and coil weight tables for strip steel. Precision Steel Warehouse Inc., 3500 N. Wolf Rd., Franklin Park, Ill.

Brazing Alloy

Data Sheet No. 22 describes the properties and applications of Nicrobraz 50, a new nickel-base brazing alloy for high temperature service. Stainless Processing Div., Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich.

Fork Lift Trucks

Booklet BU-481 sets forth the features of GS-approved fork lift trucks of 3000 to 10,000 lb capacity. They operate safely in hazardous areas. Engine-Material Handling Div., Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Industrial Switches

Catalog 62c is an enlarged 32-page edition that covers basic switches for industrial and commercial applications. Covered are the high-precision roller lever switch, the adjustable actuator switch, and the "pulse" switch. Micro Switch Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill.

High-Vacuum Valves

Applications, features, and dimensions of over 250 high-vacuum valves are detailed in Bulletin V-3. NRC Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass.

NEW BOOKS

Large Fatigue Testing Machines and Their Results, Special Technical Publication No. 216, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 162 pages, $4.25

Considerable experimental difficulties are encountered in large specimen fatigue testing. Interpretation of data in the light of the controversial size effect is difficult. This symposium will aid in the clarification of the role of fatigue testing and will give information on new techniques for large scale testing. Included are eight papers which were presented at the symposium and two related papers submitted by Soviet engineers. The papers were presented in June, 1957. The publication includes late discussions, illustrations, and references.

Investment Casting Specification, Investment Casting Institute, 27 E. Monroe St., Chicago 3, Ill. 36 pages (9 specification sheets), $1

Two new investment casting metal specifications have been completed by the Investment Casting Institute: FE-3 for cast nickel-chromium stainless steel, and CU-2 covering the investment casting specifications for beryllium copper. ICI metal specifications are designed as an industry consensus of good practice for both the foundry and the user. They are developed by the institute's Metals Division and are finalized after years of research and consultation with manufacturers in the industry, with users, and with other specification bodies. Price includes seven other investment casting specifications.

Roebling Tire Bead Wire: Packaged for Maximum Benefit

The problems eliminated by this unique reel-less core packaging system are manifold. Loads are palletized two cores per pallet and may be stacked two or three high. This, plus the fact that you need not accumulate empty reels means storage space requirements are cut to *less than half*. You do away with all freight and handling costs on reels, the bother and expense of "bookkeeping" returnable reels, and the freezing of money in reel deposits.

This is typical of Roebling's advanced packaging methods—that makes handling Roebling high-quality wire so much easier. For details on this efficient Roebling Tire Bead Wire packaging method, or information on other types of Roebling wire, write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

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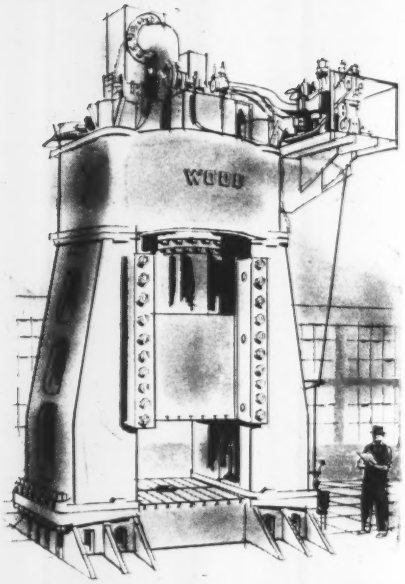
Treat 'em rough,
These Wood Valves can take it.

Presses take a beating? No need to worry about the effect on your hydraulic system if Wood Valves are at work. They're built to handle the toughest jobs. For example, this 3"x1½" special main control valve is installed on a 1500 ton forging press. Operating conditions demand extremes in acceleration and deceleration, yet the valve assures shock-free, efficient service due to its inverse flow design. Control of the ram is precise, accurate . . . with shockless decompression. You can also see a fully balanced throttle valve and a 3"x7" shock alleviator, further examples of Wood's complete line of quality high-pressure valves. Write today for complete information.



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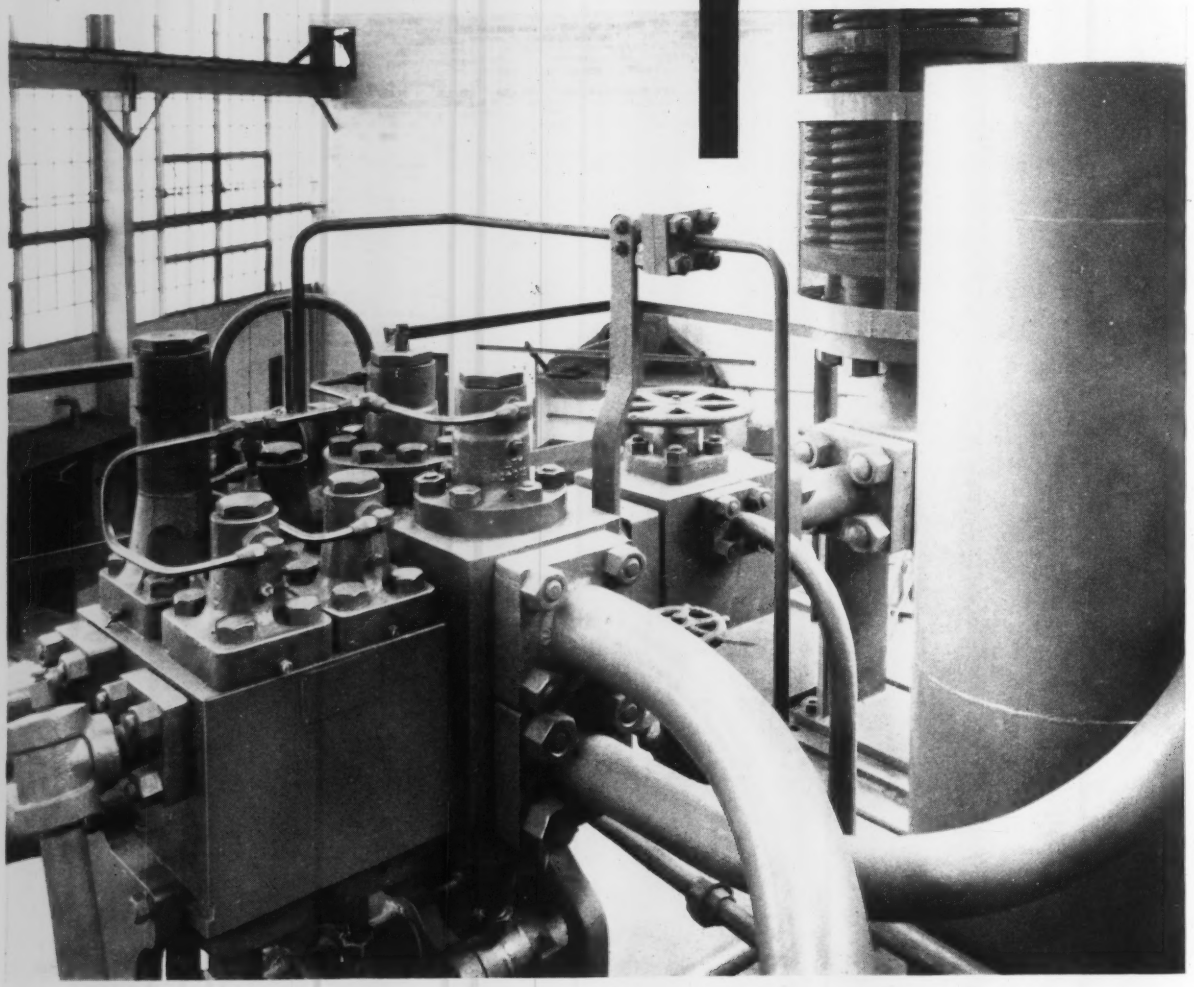

Market Outlook

Buyers See Need for Bigger Stocks

STEEL consumers are starting to look ahead as mills extend delivery promises. Cold-rolled sheet buyers are giving suppliers 45 days' notice of their requirements instead of 30. They know that steel's going to get tighter as automakers, appliance manufacturers, and other users come into the market for bigger tonnages.

"Buyers would do well to follow leadtimes closely," says the National Association of Purchasing Agents. "Inventories of steel in consumers' hands are thought to be low. As their production requirements increase, we can be certain their inventories will increase proportionately."

STEEL STRIKE IN '59?— Although it hopes users won't be "stampeded into excessive buying," NAPA warns of a "distinct possibility" of a steel strike next summer. Its advice: Buyers who operate under a budget system should include in their 1959 forecast some increase in inventory as protection against a shutdown.

WHAT ABOUT PRICES?— A majority of NAPA's Steel Committee believes that prices will hold until July. Others align themselves with some of STEEL's informants (Sept. 29, p. 113). They think increases in extras are likely if the operating rate exceeds 80 per cent of capacity.

AUTOMOTIVE OUTLOOK— Frustrated for several weeks in their efforts to reach full production, automakers are scheduling double shift operations. They'll have to work overtime for five or six weeks just to meet dealers' initial requirements. Steel inventories are low, but it won't take much building to bring them up to the desired level: 25 or 30 days. As automotive output increases, steelmakers may not get bigger orders, but they'll get more of them.

RAILROADS REVIVE— Hard pressed for cash, the railroads have held their purchases to a minimum this year. To date, they've accounted for only 2.8 per cent of domestic steel shipments (vs. 5.5 per cent in 1957). Now they're beginning to order rolling equipment, rails, and plates (so they can build cars in their own shops). Steelmakers hope these orders will help offset seasonal declines in construction steels and tin plate.

TOOL STEELS TURN UP— Tool steel producers are having their poorest years since 1949 but are convinced that the worst is over. "July was the turning point," says one of the leaders. "Every month since has topped the previous one. We'll ship about 25 per cent more steel this month than we did in September. Next month will be even better. If it weren't for the holidays and inventory adjustments, December would possibly be the best month of the year." Improved demand reflects the start of tooling for 1960 cars, depletion of inventories, and widespread gains in industrial production.

MAUTHE LOOKS AHEAD— The fourth quarter will be the best of the year for Youngstown Sheet & Tube Co., predicts its chairman, J. L. Mauthe. He believes these factors will determine how much of the improvement is carried over into 1959: 1. The degree to which 1959 autos gain public acceptance. 2. The effect of higher interest rates on new home construction and capital goods expenditures. 3. The disposition of the Memphis Case, which has discouraged construction of gas transmission lines.

OUTPUT HITS '58 HIGH— Last week, steelmaking operations reached a new high for the year. The ingot rate advanced 1 point to 75 per cent of capacity. Production was about 2,024,000 net tons of steel for ingots and castings. During the corresponding week last year, the industry's output was 2,052,000 tons.

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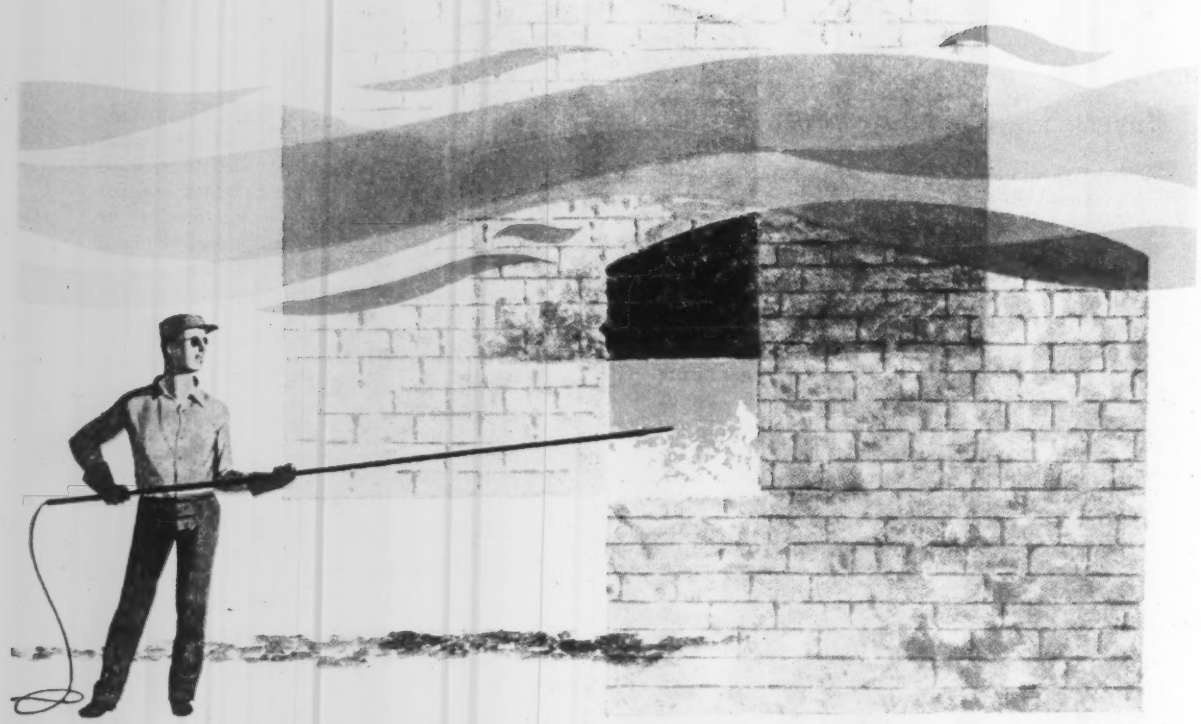
KAISER CHEMICALS



3 Campaigns with open hearth endwalls of Kaiser Periclase Chrome Brick!

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• "After two campaigns of 90 and 106 heats, Brand 'A' were removed from the down-river end and Kaiser Periclase Chrome Brick are going to complete a third campaign in the up-river end."

• "Furnace this month finished third campaign of 176 heats, and at that time Kaiser Periclase Chrome endwall had gone through 562 heats. At this writing, this endwall has approximately 600 heats..."

Every month reports like these bring more and more dramatic evidence of improved endwall service. And more often than not, these reports show how *new shop records* have been established with Kaiser Periclase Chrome Brick. Here are the properties that make possible such performance:

1. Volume Stability. Chromite content is the minimum amount necessary to provide resistance to thermal shock. Lowering of chromite also reduces swelling in presence of iron oxide, thus minimizes buckling and peeling.

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3. Outstanding Resistance to Distortion and Shrinkage because there is no liquid phase in the conversion from chemical to ceramic bond.

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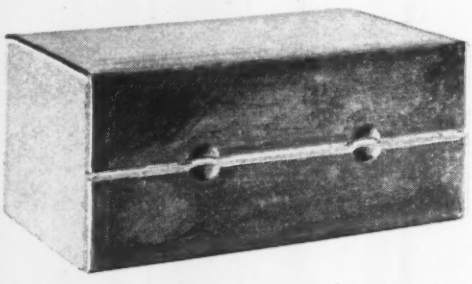

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National Malleable & Steel Casting Co.

Steel Casting Shipments

*1959	1,530,000	tons
*1958	1,200,000	"
1957	1,766,191	"
1956	1,931,987	"
1955	1,530,000	"
1954	1,184,000	"

*Estimated.
Source: Steel Founders' Society of America.

Foundry Upturn Begins, Strength Depends on Rails

STEEL FOUNDRIES are finally showing signs of recovery. "September was the first month since August, 1956, in which foundries received orders for more castings than they shipped," says F. Kermit Donaldson, executive vice president of the Steel Founders' Society of America.

While that's encouraging, the industry needs many more plus months because it has practically no backlogs left.

• **Slow Uptrend Seen**—The order pickup will steadily—but slowly—improve as general business conditions get better. It won't quicken until railroads begin ordering new equipment, especially freight cars.

About 42,000 cars will be built this year from orders received in 1956 and 1957. The Railway Progress Institute says 79,800 cars should be built each year for normal replacement and expansion. Casters' prosperity hinges on railroad business since it accounts for 35 to 40 per cent of the steel castings produced.

• **Same Old Story**—Metalworking's problems of low backlogs, quick deliveries, increased costs, harder selling, more service, and rock bottom profit margins also apply to the steel casters, as does the attendant evil—price cutting.

"We have had to cut prices just to stay competitive," is a common lament—or excuse.

• **Price Cutting To Die**—This situation will soon evaporate. Many foundries intend to boost prices 5 to 10 per cent during this quarter, if the business upturn maintains its strength, to get back some of their lost profits; some have already added about 5 per cent. Reason: The recession depressed prices so far that many shops just broke even. In those still showing a profit, material and labor costs have been eating away what fat remains. (STEEL's respondents report costs up 8 per cent over Jan. 1.)

• **Cost Cutting Helps Profits** — Swedish Crucible Steel Corp., Detroit, sees other ways to build profit margins without relying entirely on higher prices.

"The area in which our business will have to advance is in cutting labor costs," says Kenneth Withey, plant manager.

"We are just completing a cost cutting program in which we:

"1. Cleaned house to get more out of our present equipment and to avoid backtracking.

"2. Rearranged our equipment to get the best material flow.

"3. Mechanized molding and core manufacturing facilities as much as possible."

"The foundry industry must employ product development if it's going to remain competitive," says Mr. Withey. Following its own philosophy, Swedish Crucible is going into the construction equipment, mining, railroad, and trucktrailer fields. Its business now is in passenger cars, trucks, and military tanks.

But another company says: "We have been looking at other areas, but it's difficult to diversify in this kind of business."

• **Casting Weight Drops** — The unit weight of steel castings is dropping rapidly. The use of strain gages to accurately measure the loading on parts while in use is making the guessing of strength tolerances a thing of the past.

"Parts can now be designed with safety factors of one and one-half

instead of a guessed at factor of three which was formerly necessary," says Mr. Donaldson. "This is effectively cutting down the weight and bulk of steel castings," he said, "extending their uses."

• **Heat Treating Ups Strength** — The strength of low alloy castings is being boosted higher than ever before through full heat treating.

Parts such as crankshafts, truck axles, and kingpins can now be cast, having the strength of the previously used form. Casting also provides the freedom of design inherent in cast steel.

"More and more complex forms demanding high strength will be cast in the near future," says Mr. Donaldson.

Pig Iron . . .

Pig Iron Prices, Page 128

Foundry business is lagging far behind the recovery pace set by the general metalworking industries. Automotive foundries are more active, but most jobbing foundries are still waiting for better business.

Prospects for the remainder of the year are brighter, especially now that the auto industry is starting to get into high gear. Many local labor disturbances have quieted down and others are fading.

More blast furnaces are being relighted. Republic Steel Corp., for instance, has blown in the No. 3 blast furnace at its Youngstown Works. This 1300-ton unit is the third placed in operation. For a long time, only one was needed at the plant. One of the two idle furnaces is being relined.

Offerings of foreign iron are undercutting the market for domestic metal on the eastern seaboard. West German No. 2 foundry iron has been sold at the equivalent of well under $60, cars, Philadelphia. Dutch iron of similar grade is being offered at a substantially higher price, but still well below the domestic market.

Blast Furnace Output Up

Production of blast furnace products (pig iron, ferromanganese and spiegeleisen) totaled 5,072,390 net tons in September, reports the American Iron & Steel Institute. Of the total, 31,348 tons were ferroalloys. In the preceding month, the total was 4,799,955 tons (including 31,374 tons of ferroalloys), and in September, 1957, it was 6,627,911 tons (including 58,837 tons of ferroalloys).

Output in the first nine months this year amounted to 39,881,534 tons, including 341,713 tons of ferroalloys. In the like 1957 period the total was 61,760,634 tons, including 582,239 tons of ferroalloys.

Production by states:

BLAST FURNACE PRODUCTION—SEPTEMBER, 1958

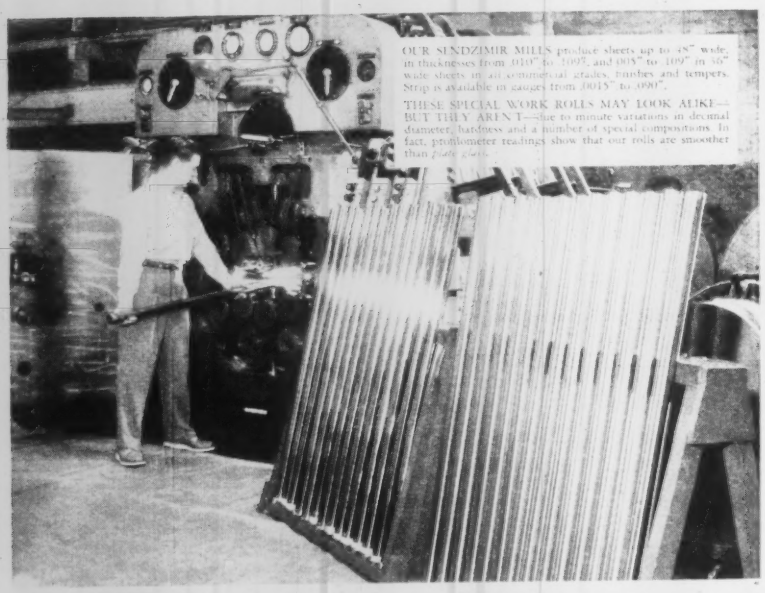
(Pig iron & ferroalloys; net tons)

States:	September, 1958	Nine Months, 1958
Massachusetts, New York	250,023	2,561,550
Pennsylvania	1,298,504	10,452,631
Maryland, Virginia, West Virginia	551,156	4,324,182
Kentucky, Tennessee, and Texas	135,325	1,144,903
Alabama	268,170	2,428,912
Ohio	878,941	6,381,198
Indiana	695,892	5,382,351
Illinois	397,175	2,703,674
Michigan, Minnesota	304,132	2,086,044
Colorado, Utah, and California	293,072	2,416,089
Totals	5,072,390*	39,881,534**

*Includes 31,348 tons of ferromanganese and spiegeleisen.

**Includes 341,713 tons of ferromanganese and spiegeleisen.

Source: American Iron & Steel Institute.


OUR SENDZIMIR MILLS produce sheets up to 48" wide, in thicknesses from .010" to .109", and .015" to .109" in 36" wide sheets in all commercial grades, finishes and tempers. Strip is available in gauges from .0015" to .090".
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Every hot-rolled stainless steel band has variations in thickness and surface characteristics which must be compensated for in the cold-reduction process to obtain precise gauge and flawless surfaces. To do this, special work rolls with minute diameter differences along the length of the roll are used in controlling such variations as crown, edge and camber. To accurately control all the possible variations requires a large number of these rolls, plus *highly skilled operators* who know from experience which rolls, speeds and reductions are required. These are but a few of important factors in quality rolling which can only be learned by *long* experience and association with precision mills.

Washington Steel is the only producer whose entire production stainless steel sheet and strip is rolled exclusively on the Sendzimir Mill.

WASHINGTON STEEL CORPORATION
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Wire . . .

Wire Prices, Pages 123 & 124

Improvement in demand for wire and wire products has lifted mill operations noticeably. In some cases primary steel production has been upped to 80 per cent of capacity. In a number of instances, primary capacity at wire mills is engaged at a rate several points above that for the steel industry as a whole.

Buying is notable for its broad base. An eastern producer notes a spurt in requirements for corset and umbrella wire from consumers who have been out of the market for months. Automotive volume has picked up noticeably. Releases on auto accounts will get heavier as local plant strikes are settled.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 122 & 123

Auto tonnage is disappointing because work stoppages have resulted in delayed shipments. But brisk demand for sheets and strip is developing; deliveries are being pushed a little further into the future.

Even though there's considerable room for improvement, the flat-rolled items now appear to be the most active of the major steel products. Deliveries are becoming more extended—hot rolled is being quoted around four weeks, cold rolled five to seven weeks. Producers of galvanized sheets are sold up well into December; coated specialties are sold for the rest of the year.

• **Full Operations**—On the basis of orders in hand, some Midwest producers expect full operations on cold rolled, hot rolled, and galvanized sheets the next two months. Some consumers are ordering further ahead, 45 days instead of 30, but there's still no evidence of a real inventory buildup—yearend taxes are a factor. But more consumers are estimating their first quarter requirements and will place November and December orders.

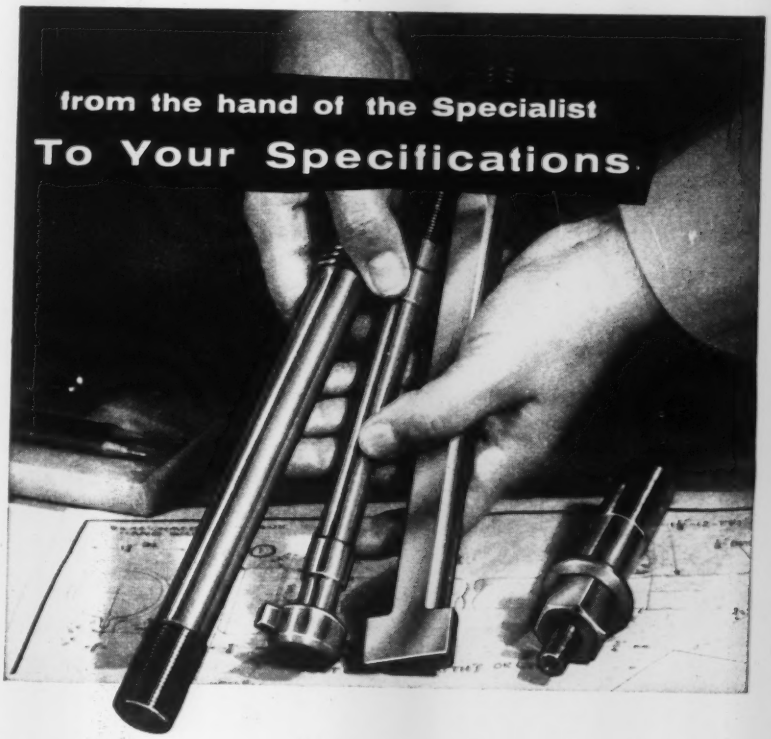
Brisk miscellaneous demand is developing for cold-rolled sheets. Household appliance makers, sanitaryware producers, and commercial refrigeration interests are actively in the market. However, current buying, in some areas of this diversified consumption, is thought running ahead of consumption.

• **Expect Auto Pickup**—A sharp pickup in automotive requirements is seen when strike-bound plants resume production. Sales prospects for the new model cars hold out the promise of a strong demand for flat-rolled steel well into 1959.

Some auto partmakers have been forced to hold up shipments until their customers (auto builders) are ready to accept finished parts. Framemakers are among those adversely affected.

Shipments of steel barrels and drums totaled 2,663,306 units in August, barely edging the 2,663,029 shipped in July, reports the Bureau of the Census. In August last year, shipments were 3,061,671. For the first eight months this year, the movement amounted to 20,767,211, vs. 24,762,946 in the like 1957 period.

Steel pail shipments in August were 6,441,101 units, down from the 6,702,727 moved in July, and the 6,626,784, reported for August, 1957. Movement for the first eight months was 48,377,250, vs. 52,036,782 in the same period last year.



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Delivered Pricing System Is Proposed for Bolts and Nuts

A major change in pricing industrial fasteners is proposed by Pittsburgh Screw & Bolt Corp., Pittsburgh. The company is seeking customer opinion regarding "a pattern (of pricing) which will take the inconsistencies and impracticabilities out of the present structure." Final action depends on customer reaction.

Objective: 1. The company wants to replace the present complex list and discount system with a net price system. 2. It wishes to eliminate the freight variable on truckload and carload quantities, replacing this with delivered prices effective throughout the country.

Present fastener pricing practice has been in effect over 50 years. List prices were published in 1932 and 1955 by most producers. These lists have held unchanged since, but revised discounts have been published periodically.

Under net pricing, published lists would show the exact net prices of the various items. As for the freight variable, a purchaser now must figure the net price from the list and discount, and then compare freight charges from plants of competing bolt and nut manufacturers. To be competitive, many boltmakers absorb freight to meet the freight charges of makers nearest the customer. Pittsburgh Screw's proposed delivered prices per truckload and carload lots would apply at all points.

Another suggested change involves simplification of the product classification system. Many presently recognized differences between product classes exist only on price books, the company says.

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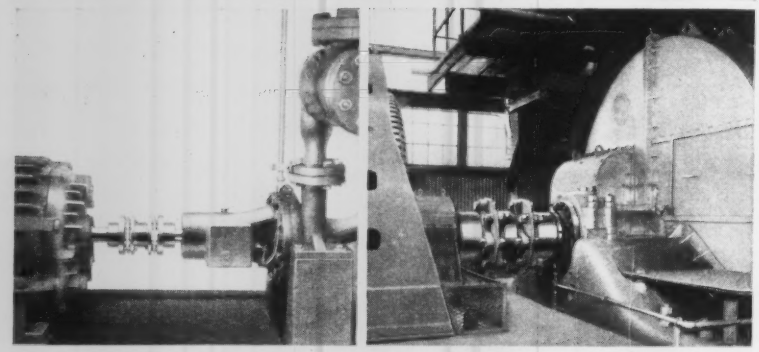

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THOMAS FLEXIBLE COUPLING COMPANY

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Fasteners . . .

Bolt, Nut, Rivet Prices, Page 124

Prices on nine popular sizes of Non-Link Positive lock washers have been sharply reduced by the Positive Lock Washer Co., Newark, N. J., bringing them into line with prices on conventional spring-type washers. The lower prices are made possible by development of an automatic machine process which produces nonlink positive, tooth, or barb-type helical spring washers in a continuous operation.

Tubular Goods . . .

Tubular Goods Prices, Page 127

While automotive inquiries for mechanical tubing are being received in greater volume, few new orders have materialized, Pittsburgh district producers report.

One sales official said: "We know that some tonnage is being held up by strikes. In spite of the delays, our October shipments will exceed last month's. We look for a 10 to 12 per cent increase during November."

Pressure tubing sales are on the upgrade, with most of the activity being generated by boilermakers.

Demand from the appliance industry remains sluggish, but there are signs of modest improvement. Orders from refrigerator manufacturers are somewhat larger than they have been in recent months.

Large diameter pipe is in better demand on the West Coast. The market for the product in that market has been dull for months, large-

ly because of litigation involving the natural gas rate structure.

Lone Star Steel Co., Lone Star, Tex., has resumed operation of two open hearths that have been idle since Aug. 3. The move was made necessary by the depletion of pipe inventories in some sizes. As soon as semifinished steel is available, the electric pipe mills will resume production.

Tool Steel . . .

Tool Steel Prices, Page 127

Tool steel producers are having their poorest year since 1949, but many of them are convinced that the worst of the business slump is over.

"July was the turning point," said one Pittsburgh area maker last week. "Every month since has been better than its predecessor. We'll ship about 25 per cent more steel this month than we did in September.

"Next month will be still better, and if it weren't for the holidays and inventory adjustments, December would probably be the best month of the year. Shipments may fall slightly at the yearend, but we foresee no weakening of the trend toward better bookings."

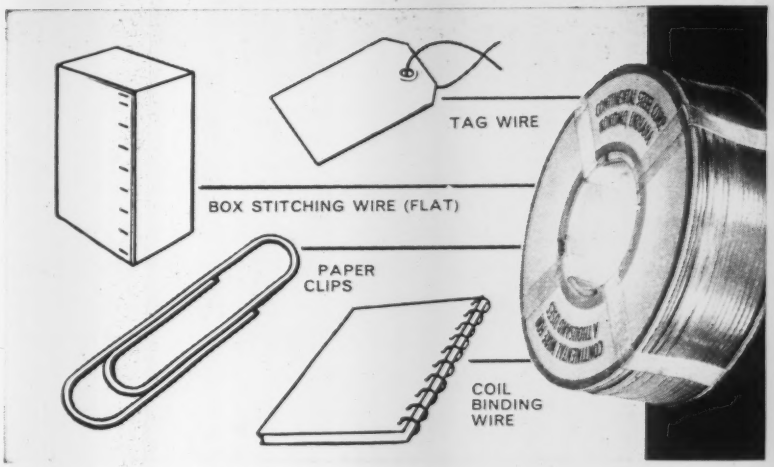
Steel Bars . . .

Bar Prices, Page 121

More diversified demand is developing in the steel bar market. Orders are more numerous, and consumers' requirements are broadening, both as to sizes and uses. Demand is not brisk, but the improvement in ordering signals an encouraging upturn in consumption and possibly some buying for inventory.

Local auto strikes are holding down consumption. A Pittsburgh barmaker estimates about 30 per cent of its expected November shipments will be adversely affected by these work stoppages. Part suppliers are holding back steel orders until the automakers are ready to accept finished parts.

Despite the slight demand improvement, deliveries have not been lengthened appreciably. Hot carbon bars can still be had in two to four weeks. Cold-finished bars are available on short notice and the same is true of alloy tonnage. On small sized carbon bars, producers in the Midwest think schedules will be full through December. Leaded al-



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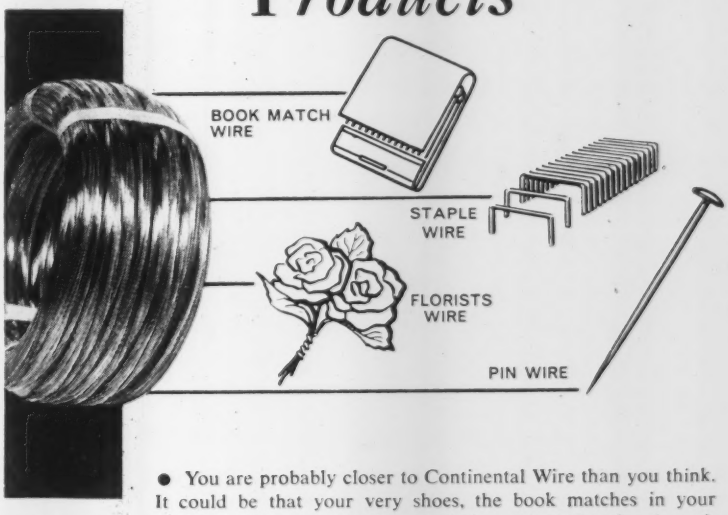

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Our treasurer explained that the Payroll Savings Plan does exactly that and gave the painter an application card. But the matter didn't end there, for our painter had given *us* something, too: an idea that helped to put real color into our plan.

He made us realize that if he was unfamiliar with this plan, many others must be in exactly the same position.

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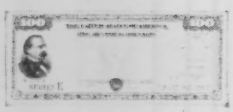

STEEL
The Metalworking Weekly

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loy bar demand is stronger, and, in some cases, deliveries are a little more extended than they were.

Cold-drawn requirements will improve steadily as automakers' needs expand with stepped-up production. Also, other consumers are likely to begin replenishing depleted inventories soon. Shipments to farm equipment and fastener manufacturers are substantial, but distributor purchasing continues sluggish.

Distributors . . .

Prices, Page 128

Demand for steel from service centers is increasing slowly. While the improvement is still well below that reported by mills, it is sufficient to spur distributors in replenishing stocks. Sales are expected to gain over the balance of this year.

Increased bookings have also supported a more widespread move among distributors to raise prices on hot-rolled carbon steel products in line with the advances posted by the mills last summer. The latest changes follow scattered revisions noted over the last few weeks. Some distributors have advanced prices on stainless steel items.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 121

Excellent fall weather is permitting highway and construction programs to proceed at full speed, keeping demand for reinforcing steel high. At the same time, general construction requirements are holding up well. Considerable work is up for fabricators' bids.

Bridges and schools figure prominently in current activity. Also, concrete construction is being used in a higher ratio of buildings than formerly.

In New England, prices at the fabricator-distributor level are more disturbing than is lack of order volume. As a result, distribution in the area is uneven, some sellers not meeting the price competition. Some who normally book a substantial share of district tonnage find themselves with small backlogs, but others are booked into next year.

Reinforcing bar prices at mills are generally firm. Contractors have not lowered their quotations for bars in place. But, in between, competition has an unsettling influence on the market.

Plates . . .

Plate Prices, Page 121

Platemakers are disappointed with October bookings, but they're expected to top last month's. Shipments this month should be second only to those last June, with deliveries on the common carbon grades running two weeks or less, and on plates requiring special processing, about six weeks.

In general, demand continues slow. Oil and gas requirements lag and, while there has been a little pickup in railroad specifications, volume remains relatively small. A few carriers have returned to the market, Trailer Train Inc. and the Chicago & North Western Railway each having ordered 1000 cars.

Ship tonnage is coming out steadily, and prospects are demand in this area of the market will improve before yearend.

Prices Cut on New Seal

Price reductions of 35 to 42 per cent on a new, high temperature static seal have been effected by Navan Products Inc., Los Angeles. The seal, first marketed last June, is being ordered in quantity for hydraulic systems of advanced airplanes and missiles, and also for test stand installations.

Steel Production Rises

Steel production totaled 7,610,372 net tons in September, of which 7,009,896 were carbon steel, 515,818 alloy, and 84,658 stainless and heat resisting, reports the American Iron & Steel Institute. In the preceding month, 7,286,003 tons were produced (6,754,197 carbon steel, 461,-

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TRU-STEEL
HIGH CARBON STEEL SHOT

853 alloy, and 69,953 stainless and heat resisting).

In September, 1957, output totaled 8,977,906 tons, of which 674,981 were alloy steel, and 1,095,494 were hot-topped carbon ingots.

During the first nine months this year, production totaled 59,069,267 tons, including 54,627,460 carbon steel, 3,847,695 alloy, and 594,112 stainless and heat resisting. Output in the like period of 1957 was: Total, 87,704,075 tons, including 6,904,511 alloy steel, and 10,517,321 hot-topped carbon ingots.

Production by states in September and the first nine months of 1958:

STEEL PRODUCTION—SEPTEMBER, 1958

(All Grades: Net Tons)

States:	September, 1958	First 9 Mo. 1958
Massachusetts, Rhode Island, and Connecticut	8,218	129,032
New York	349,940	2,685,606
Pennsylvania	1,826,272	14,749,557
New Jersey, Delaware, and Maryland	601,855	4,638,998
Virginia, W. Virginia, Kentucky, Tennessee	359,569	2,782,673
Georgia, Alabama, and Mississippi	278,860	2,557,141
Ohio	1,274,583	9,184,578
Indiana	1,114,017	8,722,115
Illinois	655,383	4,752,655
Michigan, Minnesota	476,861	3,199,379
Missouri, Oklahoma, Texas, and Colorado	268,259	2,402,777
Utah, Washington, and Oregon	181,741	1,462,869
California	214,814	1,801,887
Totals	7,610,372	59,069,267

Rails, Cars . . .

Track Material Prices, Page 124

Tidewater Southern Railway and Sacramento Northern Railway, subsidiaries of the Western Pacific Railroad, have placed orders for $841,450 worth of new equipment. Tidewater ordered fifty 50 ft insulated boxcars, costing $718,000, from Pacific Car & Foundry Co., Renton, Wash. Sacramento Northern placed ten hoppercars costing $123,450 with ACF Industries Inc.

Semifinished Steel . . .

Semifinished Prices, Page 121

The national ingot rate rose 1 point (to 75 per cent of capacity) last week, the highest level since last November. Output is estimated at about 2,024,000 net tons.

The second of three major phases in Lukens Steel Co.'s $33-million expansion program is nearing completion. The company is charging and pouring heats in its new electric furnace. Once in commercial production and integrated with other facilities, the furnace will increase Lukens' rated ingot capacity 24 per cent, from 750,000 to 930,000 tons annually. The furnace melts 100 tons of steel in each heating cycle.

Shipments of Steel Products—August, 1958

(All grades; net tons)

Products	August Shipments: Carbon	Alloy	Stainless	Total First 8 Months: 1958	1957
Ingots	11,569	8,158	630	174,231	343,063
Blooms, slabs, etc.	53,626	23,700	1,457	692,119	1,804,362
Tube rounds	724	131	27	6,002	51,832
Skelp	9,215	.....	.....	63,848	106,395
Wire rods	65,269	908	547	531,556	663,429
Structurals (heavy)	310,045	2,123	5	2,619,664	4,610,929
Steel piling	36,761	.....	.....	298,701	401,604
Plates	370,920	25,187	2,236	3,460,160	6,608,792
Rails (standard)	40,745	.....	.....	407,646	934,741
Rails (other)	2,443	.....	.....	28,169	60,976
Joint bars	3,008	.....	.....	26,060	66,406
Tie plates	8,473	.....	.....	85,889	204,957
Track spikes	3,354	.....	.....	30,044	59,626
Wheels	8,432	31	.....	107,328	257,773
Axles	2,899	9	.....	54,764	142,990
Bars (hot rolled)	359,902	92,429	2,706	3,399,450	5,403,192
Bars (reinforcing)	180,030	.....	.....	1,362,869	1,694,542
Bars (cold drawn)	64,392	10,994	3,473	614,804	928,929
Tool steel	711	4,854	.....	43,627	69,596
Standard pipe	185,677	30	2	1,434,486	1,933,750
Oil country goods	81,838	14,648	.....	716,818	2,043,122
Line pipe	228,329	.....	.....	1,859,902	2,907,666
Mechanical tubing	29,784	9,362	251	335,901	558,512
Pressure tubing	14,596	2,140	708	161,445	298,045
Wire (drawn)	193,592	2,346	1,710	1,503,321	1,816,496
Nails & staples	37,564	.....	1	292,655	328,669
Barbed wire	3,382	.....	.....	44,661	49,039
Woven wire fence	9,581	.....	.....	126,038	164,530
Bale ties, etc.	3,795	.....	.....	50,670	42,640
Black plate	49,286	.....	.....	400,753	440,908
Tin & terne plate, hot dipped	46,037	.....	.....	313,481	541,695
Tin plate, electro	464,439	.....	.....	3,487,014	3,573,610
Sheets (hot rolled)	455,630	16,226	2,472	3,655,671	5,463,746
Sheets (cold rolled)	786,085	3,721	9,825	5,902,443	7,818,636
Sheets (galvanized)	253,259	4	.....	1,759,587	1,646,064
Sheets (other coated)	16,239	.....	.....	104,408	132,930
Electrical sheets & strip	1,875	30,447	.....	277,174	444,604
Strip (hot rolled)	85,051	1,413	698	595,959	971,352
Strip (cold rolled)	65,053	2,387	13,417	589,052	802,566
Totals (1958)	4,543,610	251,248	40,165	37,618,370	.....
Totals (1957)	5,832,324	352,974	44,555	.....	56,392,714

Data from American Iron & Steel Institute.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

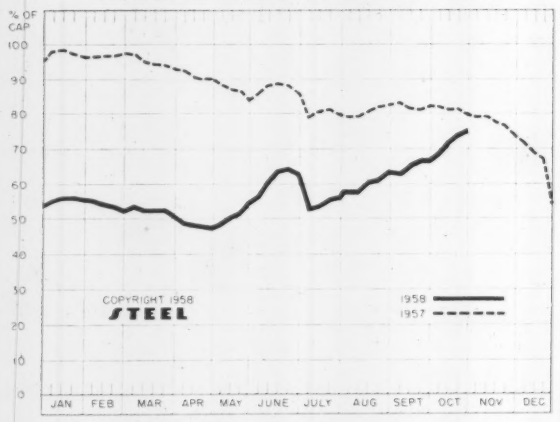
	Week Ended Oct. 26	Change	Same Week 1957	1956
Pittsburgh	69.5	+ 2.5*	81	100.5
Chicago	85	+ 0.5	83	102.5
Eastern	71	+ 1	81	101
Youngstown	64	0	65	102
Wheeling	83	+ 1	72.5	103.5
Cleveland	80	+ 0.5*	93.5	107.5
Buffalo	78	0	95	107.5
Birmingham	63.5	— 2.5	71.5	95.5
Cincinnati	83	+ 3.5	85.5	100.5
St. Louis	96	— 2.5*	90.5	94.5
Detroit	82	0*	98	100
Western	75	0	92	105
National Rate	75	+ 1	79.5	101.5

INGOT PRODUCTION‡

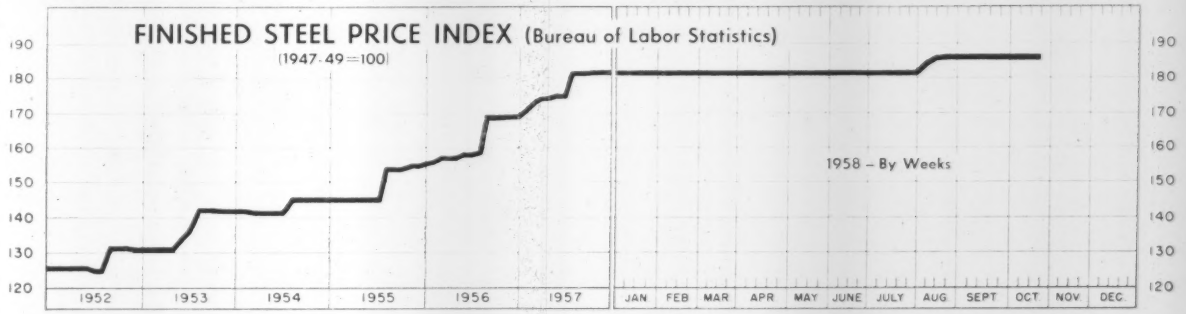
	Week Ended Oct. 26	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	125.6†	124.7	113.0	127.7
NET TONS (In thousands)	2,018†	2,003	1,816	2,052

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Oct. 21, 1958	Week Ago	Month Ago	Sept. Avg	Year Ago
186.7	186.7	186.6	186.6	181.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 21

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.615
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	20.525
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.975
		Pipe, Line (100 ft)	205.710
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	26.157
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 22 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	246.65	246.65	246.65	239.15	189.38
Index in cents per lb	6.682	6.682	6.682	6.479	5.130

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.28	$149.28	$149.28	$146.03	$115.54
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	42.33	42.33	43.00	36.83	32.83

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 22 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld. Philadelphia	5.975	5.975	5.975	5.725	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.35
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.70	4.55
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.975-4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45-5.95
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.475-5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.35-6.55
Tin plate (1.50 lb)box,Pitts.	$10.30	$10.30	$10.30	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods 7/32-5/8" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton	Oct. 22 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.01	60.75
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.51	61.25
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld. Cin	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$43.50	$43.50	$43.50	$37.50	$36.50
No. 1 Heavy Melt, E. Pa.	41.00	41.00	40.00	38.00	31.50
No. 1 Heavy Melt, Chicago	42.50	42.50	45.50	35.00	29.50
No. 1 Heavy Melt, Valley	43.50	43.50	43.50	35.50	34.50
No. 1 Heavy Melt, Cleve.	40.00	40.00	40.00	32.50	31.50
No. 1 Heavy Melt, Buffalo	35.50	35.50	34.50	36.50	33.50
Rails, Rerolling, Chicago	62.00	62.50	65.50	52.50	42.50
No. 1 Cast, Chicago	45.50	45.50	46.50	35.50	32.50

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	30.50	30.50	30.50	30.50	25.25

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Steel Prices

Mill prices as reported to STEEL. Oct. 22, cents per pound except as otherwise noted. Changes shown in italics. Code number following mill points indicates producing company. Key to producers, page 122; footnotes, page 124.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $76.00

INGOTS, Alloy (NT)

Detroit S41 ..... $82.00
Economy,Pa. B14 ..... 82.00
Farrell,Pa. S3 ..... 82.00
Lowellville,O. S3 ..... 82.00
Midland,Pa. C18 ..... 82.00
Munhall,Pa. U5 ..... 82.00
Sharon,Pa. S3 ..... 82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)

Bartonville,Ill. K4 ..... $82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ..... 90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B3 ..... 80.00
Lackawanna,N.Y. B2 ..... 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 ..... 80.00
S.Chicago,Ill. R2, U5 ..... 80.00
S.Duquesne,Pa. U5 ..... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ..... $99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 ..... 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 ..... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 ..... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 ..... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 ..... 99.50
Lackawanna,N.Y. B2 ..... 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 ..... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 ..... 99.50
Seattle B3 ..... 113.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 ..... 99.50
S.Duquesne,Pa. U5 ..... 99.50
S.SanFrancisco B3 ..... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)

Bethlehem,Pa. R2 ..... $119.00
Bridgeport,Conn. C32 ..... 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 ..... 119.00
Conshohocken,Pa. A3 ..... 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 ..... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 ..... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 ..... 119.00
Johnstown,Pa. B2 ..... 119.00
Lackawanna,N.Y. B2 ..... 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 ..... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 ..... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 ..... 119.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14 ..... 119.00
S.Duquesne,Pa. U5 ..... 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 ..... $122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 ..... 122.50
S.Duquesne,Pa. U5 ..... 122.50
Warren,O. C17 ..... 122.50

SKELP

Aliquippa,Pa. J5 ..... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 ..... 5.05

WIRE RODS

AlabamaCity,Ala. R2 ..... 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 ..... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1 ..... 6.40
Johnstown,Pa. B2 ..... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 ..... 6.65
Kokomo Ind. C16 ..... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 ..... 6.65
Monessen,Pa. P7 ..... 6.40
N.Tonawanda,N.Y. B11 ..... 6.40
Pittsburg,Calif. C11 ..... 7.20
Portsmouth,O. P12 ..... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14 ..... 6.40
SparrowsPoint,Md. B2 ..... 6.50
Sterling,Ill.(1) N15 ..... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 ..... 6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity,Ala. R2 ..... 5.50
Aliquippa,Pa. J5 ..... 5.50
Atlanta A11 ..... 5.70
Bessemer,Ala. T2 ..... 5.50
Bethlehem,Pa. B2 ..... 5.55
Birmingham C15 ..... 5.50
Clairton,Pa. U5 ..... 5.50
Fairfield,Ala. T2 ..... 5.50
Fontana,Calif. K1 ..... 6.30
Gary,Ind. U5 ..... 5.50
Geneva,Utah C11 ..... 5.50
Houston S5 ..... 5.60
Ind.Harbor,Ind. I-2, Y1 ..... 5.50
Johnstown,Pa. B2 ..... 5.55
Joliet,Ill. P22 ..... 5.50
KansasCity,Mo. S5 ..... 5.60
Lackawanna,N.Y. B2 ..... 5.55
LosAngeles B3 ..... 6.20
Minnequa,Colo. C10 ..... 5.80
Munhall,Pa. U5 ..... 5.50
Niles,Calif. P1 ..... 6.25
Phoenixville,Pa. P4 ..... 5.55
Portland,Oreg. O4 ..... 6.25
Seattle B3 ..... 6.25
S.Chicago,Ill. U5, W14 ..... 5.50
S.SanFrancisco B3 ..... 6.15
Sterling,Ill. N15 ..... 5.50
Torrance,Calif. C11 ..... 6.20
Weirton,W.Va. W6 ..... 5.50

Wide Flange

Bethlehem,Pa. B2 ..... 5.55
Clairton,Pa. U5 ..... 5.50
Fontana,Calif. K1 ..... 6.45
IndianaHarbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
Phoenixville,Pa. P4 ..... 5.55
S.Chicago,Ill. U5 ..... 5.50
Weirton,W.Va. W6 ..... 5.50

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 6.90
Munhall,Pa. U5 ..... 6.80
S.Chicago,Ill. U5, W14 ..... 6.80

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 8.05
Bessemer,Ala. T2 ..... 8.05
Bethlehem,Pa. B2 ..... 8.10
Clairton,Pa. U5 ..... 8.05
Fairfield,Ala. T2 ..... 8.05
Fontana,Calif. K1 ..... 8.85
Gary,Ind. U5 ..... 8.05
Geneva,Utah C11 ..... 8.05
Houston S5 ..... 8.15
Ind.Harbor,Ind. I-2, Y1 ..... 8.05
Johnstown,Pa. B2 ..... 8.10
KansasCity,Mo. S5 ..... 8.15
Lackawanna,N.Y. B2 ..... 8.10
LosAngeles B3 ..... 8.75
Munhall,Pa. U5 ..... 8.05
Seattle B3 ..... 8.80
S.Chicago,Ill. U5, W14 ..... 8.05
S.SanFrancisco B3 ..... 8.70
Struthers,O. Y1 ..... 8.05

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 8.10
Ind.Harbor,Ind. I-2 ..... 8.05
Lackawanna,N.Y. B2 ..... 8.10
Munhall,Pa. U5 ..... 8.05
S.Chicago,Ill. U5 ..... 8.05

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 5.55
Ind.Harbor,Ind. I-2 ..... 5.50
Lackawanna,N.Y. B2 ..... 5.55
Munhall,Pa. U5 ..... 5.50
S.Chicago,Ill. I-2, U5 ..... 5.50

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ..... 6.50
Lackawanna,N.Y. B2 ..... 6.50
Munhall,Pa. U5 ..... 6.50
S.Chicago,Ill. I-2, U5 ..... 6.50
Weirton,W.Va. W6 ..... 6.50

PLATES

PLATES, Carbon Steel

AlabamaCity,Ala. R2 ..... 5.30
Aliquippa,Pa. J5 ..... 5.30
Ashland,Ky.(15) A10 ..... 5.30
Atlanta A11 ..... 5.50
Bessemer,Ala. T2 ..... 5.30
Clairton,Pa. U5 ..... 5.30
Claymont,Del. C22 ..... 5.30
Cleveland J5, R2 ..... 5.30
Coatesville,Pa. L7 ..... 5.30
Conshohocken,Pa. A3 ..... 5.30
Ecorse,Mich. G5 ..... 5.30
Fairfield,Ala. T2 ..... 5.30
Farrell,Pa. S3 ..... 5.30
Fontana,Calif.(30) K1 ..... 6.10
Gary,Ind. U5 ..... 5.30
Geneva,Utah C11 ..... 5.30
GraniteCity,Ill. G4 ..... 5.40
Harrisburg,Pa. P4 ..... 5.30
Houston S5 ..... 5.40
Ind.Harbor,Ind. I-2, Y1 ..... 5.30
Johnstown,Pa. B2 ..... 5.30
Lackawanna,N.Y. B2 ..... 5.30
Mansfield,O. E6 ..... 5.30
Minnequa,Colo. C10 ..... 6.15
Munhall,Pa. U5 ..... 5.30
Newport,Ky. A2 ..... 5.30
Pittsburgh J5 ..... 5.30
Riverdale,Ill. A1 ..... 5.30
Seattle B3 ..... 6.20
Sharon,Pa. S3 ..... 5.30
S.Chicago,Ill. U5, W14 ..... 5.30
SparrowsPoint,Md. B2 ..... 5.30
Sterling,Ill. N15 ..... 5.30
Steubenville,O. W10 ..... 5.30
Warren,O. R2 ..... 5.30
Youngstown U5, Y1 ..... 5.30
Youngstown(27) R2 ..... 5.30

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ..... 6.75
Fontana,Calif. K1 ..... 7.85
Geneva,Utah C11 ..... 7.05
Houston S5 ..... 7.15
Johnstown,Pa. B2 ..... 7.05
SparrowsPoint,Md. B2 ..... 7.05

PLATES, Wrought Iron

Economy,Pa. B14 ..... 13.55

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.95
Ashland,Ky. A10 ..... 7.95
Bessemer,Ala. T2 ..... 7.95
Clairton,Pa. U5 ..... 7.95
Claymont,Del. C22 ..... 7.95
Cleveland J5, R2 ..... 7.95
Coatesville,Pa. L7 ..... 7.95
Conshohocken,Pa. A3 ..... 7.95
Economy,Pa. B14 ..... 7.95
Ecorse,Mich. G5 ..... 7.95
Fairfield,Ala. T2 ..... 7.95
Farrell,Pa. S3 ..... 7.95
Fontana,Calif.(30) K1 ..... 8.75
Gary,Ind. U5 ..... 7.95
Geneva,Utah C11 ..... 7.95
Houston S5 ..... 8.05
Ind.Harbor,Ind. I-2, Y1 ..... 7.95
Johnstown,Pa. B2 ..... 7.95
Munhall,Pa. U5 ..... 7.95
Pittsburgh J5 ..... 7.95
Seattle B3 ..... 8.85
Sharon,Pa. S3 ..... 7.95
S.Chicago,Ill. U5, W14 ..... 7.95
SparrowsPoint,Md. B2 ..... 7.95
Warren,O. R2 ..... 7.95
Youngstown U5, Y1 ..... 7.95

PLATES, ALLOY

Aliquippa,Pa. J5 ..... 7.50
Claymont,Del. C22 ..... 7.50
Coatesville,Pa. L17 ..... 7.50
Economy,Pa. B14 ..... 7.50
Farrell,Pa. S3 ..... 7.50
Fontana,Calif. K1 ..... 8.30
Gary,Ind. U5 ..... 7.50
Houston S5 ..... 7.60
Ind.Harbor,Ind. Y1 ..... 7.50
Johnstown,Pa. B2 ..... 7.50
Lowellville,O. S3 ..... 7.50
Munhall,Pa. U5 ..... 7.50
Newport,Ky. A2 ..... 7.50
Pittsburgh J5 ..... 7.50
Seattle B3 ..... 8.40
Sharon,Pa. S3 ..... 7.50
S.Chicago,Ill. U5, W14 ..... 7.50
SparrowsPoint,Md. B2 ..... 7.50
Youngstown Y1 ..... 7.50

FLOOR PLATES

Cleveland J5 ..... 6.375
Conshohocken,Pa. A3 ..... 6.375
Ind.Harbor,Ind. I-2 ..... 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
S.Chicago,Ill. U5 ..... 6.375

PLATES, Ingot Iron

Ashland c.l.(15) A10 ..... 5.55
Ashland l.c.l.(15) A10 ..... 6.05
Cleveland c.l. R2 ..... 6.05
Warren,O. c.l. R2 ..... 6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..... 5.675
Aliquippa,Pa.(9) J5 ..... 5.675
Alton,Ill. L1 ..... 5.875
Atlanta(9) A11 ..... 5.875
Bessemer,Ala.(9) T2 ..... 5.675
Birmingham(9) C15 ..... 5.675
Buffalo(9) R2 ..... 5.675
Canton,O.(23) R2 ..... 6.15
Clairton,Pa.(9) U5 ..... 5.675
Cleveland(9) R2 ..... 5.675
Ecorse,Mich.(9) G5 ..... 5.675
Fairfield,Ala.(9) T2 ..... 5.675
Fairless,Pa.(9) U5 ..... 5.825
Fontana,Calif.(9) K1 ..... 6.375
Gary,Ind.(9) U5 ..... 5.675
Houston(9) S5 ..... 5.925
Ind.Harbor(9) I-2, Y1 ..... 5.675
Johnstown,Pa.(9) B2 ..... 5.675
Joliet,Ill. P22 ..... 5.675
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
LosAngeles(9) B3 ..... 6.375
Massillon,O.(23) R2 ..... 6.15
Midland,Pa.(23) C18 ..... 6.025
Milton,Pa. M18 ..... 5.825
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
N.Tonawanda,N.Y.(23) B11 ..... 6.025
Owensboro,Ky.(9) G8 ..... 6.025
Pittsburg,Calif.(9) C11 ..... 6.375
Pittsburgh(9) J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
Riverdale,Ill.(9) A1 ..... 5.675
Seattle B3 ..... 6.425
S.Chicago(9) R2, U5, W14 ..... 5.675
S.Duquesne,Pa.(9) U5 ..... 5.675
S.SanFran.,Calif.(9) B3 ..... 6.425
Sterling,Ill.(1)(9) N15 ..... 5.675
Sterling,Ill.(9) N15 ..... 5.775
Struthers,O.(9) Y1 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675
Torrance,Calif.(9) C11 ..... 6.375
Warren,O. C17 ..... 6.025
Youngstown(9) R2, U5 ..... 5.675

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.725
Bethlehem,Pa. B2 ..... 6.725
Bridgeport,Conn. C32 ..... 6.80
Buffalo R2 ..... 6.725
Canton,O. R2, T7 ..... 6.725
Clairton,Pa. U5 ..... 6.725
Detroit S41 ..... 6.725
Economy,Pa. B14 ..... 6.725
Ecorse,Mich. G5 ..... 6.725
Fairless,Pa. U5 ..... 6.875
Farrell,Pa. S3 ..... 6.725
Fontana,Calif. K1 ..... 7.775
Gary,Ind. U5 ..... 6.725
Houston S5 ..... 6.975
Ind.Harbor,Ind. I-2, Y1 ..... 6.725
Johnstown,Pa. B2 ..... 6.725
KansasCity,Mo. S5 ..... 6.975
Lackawanna,N.Y. B2 ..... 6.725
LosAngeles B3 ..... 7.775
Lowellville,O. S3 ..... 6.725
Massillon,O. R2 ..... 6.725
Midland,Pa. C18 ..... 6.725
Owensboro,Ky. G8 ..... 6.725
Pittsburgh J5 ..... 6.725
Sharon,Pa. S3 ..... 6.725
S.Chicago R2, U5, W14 ..... 6.725
S.Duquesne,Pa. U5 ..... 6.725
Struthers,O. Y1 ..... 6.725
Warren,O. C17 ..... 6.725
Youngstown U5 ..... 6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy

Aliquippa,Pa. J5 ..... 8.30
Bessemer,Ala. T2 ..... 8.30
Bethlehem,Pa. B2 ..... 8.30
Clairton,Pa. U5 ..... 8.30
Cleveland R2 ..... 8.30
Ecorse,Mich. G5 ..... 8.30
Fairfield,Ala. T2 ..... 8.30
Fontana,Calif. K1 ..... 9.00
Gary,Ind. U5 ..... 8.30
Houston S5 ..... 8.55
Ind.Harbor,Ind. Y1 ..... 8.30
Johnstown,Pa. B2 ..... 8.30
KansasCity,Mo. S5 ..... 8.55
Lackawanna,N.Y. B2 ..... 8.30
LosAngeles B3 ..... 9.00
Pittsburgh J5 ..... 8.30
Seattle B3 ..... 9.05
S.Chicago,Ill. R2, W14 ..... 8.30
S.Duquesne,Pa. U5 ..... 8.30
S.SanFrancisco B3 ..... 9.05
Struthers,O. Y1 ..... 8.30
Youngstown U5 ..... 8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..... 5.825
Houston(9) S5 ..... 5.925
KansasCity,Mo.(9) S5 ..... 5.925
Lackawanna(9) B2 ..... 5.675
Sterling,Ill. N15 ..... 5.775
Sterling,Ill.(1) N15 ..... 5.675
Tonawanda,N.Y. B12 ..... 5.675

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.675
Atlanta A11 ..... 5.875
Joliet,Ill. P22 ..... 5.675
Minnequa,Colo. C10 ..... 6.125
Niles,Calif. P1 ..... 6.375
Pittsburgh J5 ..... 5.675
Portland,Oreg. O4 ..... 6.425
SanFrancisco S7 ..... 6.52
Seattle B3 ..... 6.425

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.80
Clairton,Pa. U5 ..... 6.80
Gary,Ind. U5 ..... 6.80
Houston S5 ..... 7.05
KansasCity,Mo. S5 ..... 7.05
Pittsburgh J5 ..... 6.80
Youngstown U5 ..... 6.80

BARS, C.F. Leaded
(Including leaded extra)

Carbon

LosAngeles P2, S30 ..... 11.75*

Alloy

Ambridge,Pa. W18 ..... 10.175
BeaverFalls,Pa. M12 ..... 10.175
Camden,N.J. P13 ..... 10.35
Chicago W18 ..... 10.175
Elyria,O. W8 ..... 10.175
Monaca,Pa. S17 ..... 10.175
Newark,N.J. W18 ..... 10.35
SpringCity,Pa. K3 ..... 10.35

*Grade A; add 0.050c for Grade B.

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ..... 7.65
BeaverFalls,Pa. M12,R2 ..... 7.65
Birmingham C15 ..... 8.25
Buffalo B5 ..... 7.70
Camden,N.J. P13 ..... 8.10
Carnegie,Pa. C12 ..... 7.65
Chicago W18 ..... 7.65
Cleveland A7, C20 ..... 7.65
Detroit B5, P17 ..... 7.85
Detroit S41 ..... 7.65
Donora,Pa. A7 ..... 7.65
Elyria,O. W8 ..... 7.65
FranklinPark,Ill. N5 ..... 7.65
Gary,Ind. R2 ..... 7.65
GreenBay,Wis. F7 ..... 7.65
Hammond,Ind. J5, L2 ..... 7.65
Hartford,Conn. R2 ..... 8.15
Harvey,Ill. B5 ..... 7.65
LosAngeles(9) S30 ..... 9.10
LosAngeles(9) P2, R2 ..... 9.10
Mansfield,Mass. B2 ..... 8.20
Massillon,O. R2, R8 ..... 7.65
Midland,Pa. C18 ..... 7.65
Monaca,Pa. S17 ..... 7.65
Newark,N.J. W18 ..... 8.10
NewCastle,Pa.(17) B4 ..... 7.65
Pittsburgh J5 ..... 7.65
Plymouth,Mich. P5 ..... 7.90
Putnam,Conn W18 ..... 8.20
Readville,Mass. C14 ..... 8.20
S.Chicago,Ill. W14 ..... 7.65
SpringCity,Pa. K3 ..... 8.10
Struthers,O. Y1 ..... 7.65
Warren,O. C17 ..... 7.65
Waukegan,Ill. A7 ..... 7.65
Willimantic,Conn. J5 ..... 8.15
Youngstown F3, Y1 ..... 7.65

BARS, Cold-Finished Carbon
(Turned and Ground)

Cumberland,Md.(5) C19 ..... 6.55

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 9.025
BeaverFalls,Pa. M12,R2 ..... 9.025
Bethlehem,Pa. B2 ..... 9.025
Bridgeport,Conn. C32 ..... 9.175
Buffalo B5 ..... 9.025
Camden,N.J. P13 ..... 9.20
Canton,O. T7 ..... 9.025
Carnegie,Pa. C12 ..... 9.025
Chicago W18 ..... 9.025
Cleveland A7, C20 ..... 9.025
Detroit B5, P17 ..... 9.225
Detroit S41 ..... 9.025
Donora,Pa. A7 ..... 9.025
Elyria,O. W8 ..... 9.025
FranklinPark,Ill. N5 ..... 9.025
Gary,Ind. R2 ..... 9.025
GreenBay,Wis. F7 ..... 9.025
Hammond,Ind. J5, L2 ..... 9.025
Hartford,Conn. R2 ..... 9.325
Harvey,Ill. B5 ..... 9.025
Lackawanna,N.Y. B2 ..... 9.025
LosAngeles P2, S30 ..... 11.00
Mansfield,Mass. B5 ..... 9.325
Massillon,O. R2, R8 ..... 9.025
Midland,Pa. C18 ..... 9.025
Monaca,Pa. S17 ..... 9.025
Newark,N.J. W18 ..... 9.20
Plymouth,Mich. P5 ..... 9.225
S.Chicago,Ill. W14 ..... 9.025
SpringCity,Pa. K3 ..... 9.20
Struthers,O. Y1 ..... 9.025
Warren,O. C17 ..... 9.025
Waukegan,Ill. A7 ..... 9.025
Willimantic,Conn. J5 ..... 9.325
Worcester,Mass. A7 ..... 9.325
Youngstown F3, Y1 ..... 9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(4)(26)T4 6.125
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2, Y1 5.675
Johnstown,Pa. B2 ....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.425
S.Chicago,Ill. R2, W14 .5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2 ..5.675
Sterling,Ill.(1) N15 ...5.675
Sterling,Ill. N15 ....5.775
Struthers O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ...5.675

BARS, Reinforcing, Billet (Fabricated to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 .....7.60
Lackawanna,N.Y. B2 ...7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5 U8 .....7.35
SandSprings,Okla. S5 ...7.60
Seattle B3, N14 .....7.95
SparrowsPt.,Md. B2 ...7.33
St. Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.90
Economy,Pa.(D.R.)B14 18.55
Economy(Staybolt)B14 19.00

BARS, Rail Steel

ChicagoHts.(3) C2, I-2 5.575
ChicagoHts.(4)(44) I-2 5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ...5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ...5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 .....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....6.275

SHEETS, H.R. Alloy

Gary Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1.7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall Pa. U5 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ..7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ...6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Allenport,Pa. P7 .....6.275
Aliquippa,Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless Pa. U5 .....6.325
Follansbee W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1.6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 .....6.275
Newport Ky. A2 .....6.275
Pittsburg Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 .....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2,Y1.9.275
Irvin,Pa. U5 .....9.275
Lackawanna(37) B2 ...9.275
Pittsburgh J5 .....9.275
SparrowsPoint(38) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	7.75
Fairfield T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
SparrowsPt. B2	7.225	....
Pittsburgh J5	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2 .6.875‡
Ashland,Ky. A10 .....6.875†
Canton,O. R2 .....6.875‡
Dover O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875‡
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ....6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo Ind. C16 .....6.975‡
MartinsFerry,O. W10 .6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
SparrowsPt.(39) B2 ..10.025
Pittsburgh J5 .....10.125

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Youngstown J5 .....7.50
Weirton,W.Va. W6 .....7.50

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
GraniteCity Ill. G4 ....6.875
Ind.Harbor,Ind. I-2,Y1.6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Follansbee,W.Va. F4 ...8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newnort Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Const Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke. Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..5.10
Allenport,Pa. P7 .....5.10
Alton,Ill. L1 .....5.30
Ashland,Ky.(8) A10 ....5.10
Atlanta A11 .....5.10
Bessemer,Ala. T2 .....5.10
Birmingham C15 .....5.10
Buffalo(27) R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Ind.Harbor,Ind. I-2, Y1 5.10
Johnstown,Pa.(25) B2 N5.10
Lackaw'na,N.Y.(25) B2..5.10
LosAngeles(25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa,Colo. C10 ....6.20
Riverdale,Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle(25) B3 .....6.10
Seattle N14 .....6.60
Sharon,Pa. S3 .....5.10
S.Chicago W14 .....5.10
S.SanFrancisco(25) B3..5.85
SparrowsPoint,Md. B2 ..5.10
Torrance,Calif. C11 ....5.85
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18 .....8.40
Farrell,Pa. S3 .....8.40
Gary,Ind. U5 .....8.40
Houston S5 .....8.65
Ind.Harbor,Ind. Y1 ....8.40
KansasCity,Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville,O. S3 .....8.40
Newport Ky. A2 .....8.40
Sharon,Pa. A2, S3 ....8.40
S.Chicago,Ill. W14 ....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10 ....7.575
Bessemer,Ala. T2 ....7.575
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.575
Fairfield,Ala. T2 ....7.575
Farrell,Pa. S3 .....7.575
Gary,Ind. U5 .....7.575
Ind.Harbor,Ind. I-2 Y1 7.575
Lackawanna,N.Y. B2 ..7.575
LosAngeles(25) B3 ....8.325
Seattle(25) B3 .....8.575
Sharon,Pa. S3 .....7.575
S.Chicago,Ill. W14 ....7.575
S.SanFrancisco(25) B3 8.325
SparrowsPoint,Md. B2 7.575
Warren,O. R2 .....7.575
Weirton,W.Va. W6 ....7.575
Youngstown U5, Y1 ...7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..5.35
Warren,O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S10 .....7.425
Cleveland A7, J5 .....7.425
Dearborn,Mich. D3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover,O. G6 .....7.425
Evanston,Ill. M22 ....7.525
Farrell,Pa. S3 .....7.425
Follansbee,W.Va. F4 ..7.425
Fontana,Calif. K1 ....9.20
FranklinPark,Ill. T6 ..7.525
Ind.Harbor,Ind. Y1 ....7.425
Indianapolis S41 .....7.575
LosAngeles J5 .....9.325
Los Angeles C1 .....9.30
McKeesport,Pa. E10 ...7.525
NewBedford,Mass. R10 .7.875
NewBritain,Conn. S15..7.875
NewCastle,Pa. B4, E5 ..7.425
NewHaven,Conn. D2 ...7.875
NewKensington,Pa. A6 .7.425
Pawtucket,R.I. R3 ....7.975
Pawtucket,R.I. N8 ....7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale,Ill. A1 .....7.525
Rome,N.Y.(32) R6 ....7.425
Sharon,Pa. S3 .....7.425
Trenton,N.J.(31) R5 ..8.875
Wallingford,Conn. W2..7.875
Warren,O. R2, T5 ....7.425
Worcester,Mass. A7 ...7.975
Youngstown S41, Y1 ..7.425

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Carnegie,Pa. S18 .....15.55
Cleveland A7 .....15.55
Dover,O. G6 .....15.55
Farrell,Pa. S3 .....15.55
FranklinPark,Ill. T6 ..15.55
Harrison,N.J. C18 ....15.55
Indianapolis S41 .....15.70
Lowellville,O. S3 .....15.55
Pawtucket,R.I. N8 ....15.90
Riverdale,Ill. A1 .....15.55
Sharon,Pa. S3 .....15.55
Worcester,Mass. A7 ....15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn,Mich. D3 ..10.80
Dover,O. G6 .....10.80
Farrell,Pa. S3 .....10.80
Ind.Harbor,Ind. Y1 ...10.80
Sharon,Pa. S3 .....10.80
Warren,O. R2 .....10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.25	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
NewYork W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown J5	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.425*
Dover,O. G6 .....7.425*
Evanston,Ill. M22 ....7.525*
McKeesport,Pa. E10 ...7.50*
Riverdale,Ill. A1 ....7.525*
Warren,O. B9, S3, T5 .7.425*
Worcester,Mass. A7 ...7.975
Youngstown J5 .....7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3 .....7.50
Sharon,Pa. S3 .....7.50

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.65
Farrell,Pa. S3 .....5.525
Riverdale,Ill. A1 ....5.675
Sharon,Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American

	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif.K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Ind.Harb. Y1	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va.W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10

SHEETS (22 Ga., coils & cut lengths)	T-72	T-65	T-58	T-52
Fully Processed (Semiprocessed ½c lower)				
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..8.00
Aliquinna,Pa. J5 .....8.00
Alton,Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville,Ill. K4 ....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 .....8.00
Crawfordsville,Ind. MS..8.10
Donora,Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield,Ala. T2 .....8.00
Fostoria,O.(24) S1 ....8.10
Houston S5 .....8.25
Jacksonville,Fla. M8 ..8.35
Johnstown,Pa. B2 .....8.00
Joliet Ill. A7 .....8.00
KansasCity,Mo. S5 ....8.25
Kokomo,Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa,Colo. C10 ....8.25
Monessen,Pa. P7, P16 ..8.00
N.Tonawanda,N.Y. B11 ..8.00
Palmer,Mass. W12 ....8.30
Pittsburg,Calif. C11 ....8.95
Portsmouth,O. P12 ....8.00
Rankin,Pa. A7 .....8.00
S.Chicago,Ill. R2 .....8.00
S.SanFrancisco C10 ....8.95
SparrowsPoint,Md. B2..8.10
Sterling,Ill.(1) N15 ....8.00
Sterling,Ill. N15 .....8.10
Struthers,O. Y1 .....8.00
Waukegan,Ill. A7 .....8.00
Worcester,Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria,O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville Ill K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora,Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown,Pa. B2 .....13.40
Minnequa,Colo. C10 ..12.775
Monessen,Pa. P16 .....12.65
Monessen,Pa. P7 .....12.65
Muncie,Ind. I-7 .....13.60
NewHaven,Conn. A7 ...12.95
Palmer,Mass. W12 ....13.70
Pittsburg,Calif. C11 ....13.45
Portsmouth,O. P12 ....12.65
Roebling,N.J. R5 .....12.95
SparrowsPt.,Md. B2 ...13.50
Struthers,O. Y1 .....13.40
Trenton,N.J. A7 .....12.95
Waukegan,Ill. A7 .....12.65
Worcester,Mass. A7 ...12.95

WIRE Upholstery Spring

Aliquinna,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5 ....10.00
LosAngeles B3 .....10.70
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
NewHaven,Conn. A7 ...10.05
Palmer,Mass. W12 ....10.05
Pittsburg Calif. C11 ....10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.95
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5 .....9.75
Alton,Ill. L1 .....9.95
Bartonville Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora,Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria,O. S1 .....9.80
Johnstown,Pa. B2 .....9.75
KansasCity,Mo. S5 ....10.00
LosAngeles B3 .....10.70
Millbury,Mass.(12) N6 ..10.05
Minnequa,Colo. C10 ....9.95
Monessen,Pa. P7, P16 ..9.75
Muncie,Ind. I-7 .....9.95
Palmer,Mass. W12 ....10.05
Pittsburg,Calif. C11 ....10.70
Portsmouth,O. P12 ....9.75
Roebling,N.J. R5 .....10.05
S.Chicago,Ill. R2 .....9.75
S.SanFrancisco C10 ....10.70
SparrowsPt.,Md. B2 ....9.85
Struthers,O. Y1 .....9.75
Trenton,N.J. A7 .....10.05
Waukegan,Ill. A7 .....9.75
Worcester,Mass.A7,J4,T6 10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1 .....16.50
Bartonville Ill. K4 ...16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville,Ind. MS..16.40
Fostoria,O. S1 .....16.30
Houston S5 .....16.65
Jacksonville,Fla. M8 ..16.65
Johnstown,Pa. B2 .....16.30
KansasCity,Mo. S5 ....16.55
Kokomo Ind. C16 .....16.30
Minnequa,Colo. C10 ....16.55
Monessen,Pa. P16 .....16.30
Muncie,Ind. I-7 .....16.50
Palmer,Mass. W12 .....16.60
S.SanFrancisco C10 ....17.15
Waukegan,Ill. A7 .....16.30
Worcester,Mass. A7, J6.16.60

WIRE, Tire Bead

Bartonville,Ill. K4 ....17.15
Monessen,Pa. P16 .....17.15
Roebling,N.J. R5 .....17.65

ROPE WIRE (A)

Bartonville,Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria,O. S1 .....13.45
Johnstown,Pa. B2 .....13.45
Monessen,Pa. P7 .....13.45
Muncie,Ind. I-7 .....13.65
Palmer,Mass. W12 ....13.75
Portsmouth,O. P12 ....13.45
Roebling,N.J. R5 .....13.75
St.Louis L8 .....12.75
SparrowsPt.,Md. B2 ...13.55
Struthers,O. Y1 .....13.45
Worcester,Mass. J4 ....13.75

(A) Plow and Mild Plow: add 0.25c for Improved Plow

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	11.65
Fostoria,O S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	173
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers, per cwt)

Galveston,Tex. D7	$9.10

NAILS, Cut (100 lb keg)

To Dealers (33)	
Wheeling,W.Va. W10	$9.80

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga I (per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.36
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles R3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	10.70
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	10.75
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
Los Angeles B3	11.43
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.15
SparrowsPt.,Md. B2	10.75
Sterling,Ill. (37) N15	10.75

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill. (7) N15	214

FENCE POSTS

Birmingham C15	172
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	172
Franklin,Pa. F5	177
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	*177*
Tonawanda,N.Y. B12	172

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	195§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill. (7) N15	198††

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa. 9-11½ga. J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa. (43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill. (7) N15	192††

	An'ld Galv.	Stone
WIRE (16 gage)		
Ala.City,Ala. R2	17.85	19.40**
Aliq'ppa,Pa.	J5..17.15	18.95
Bartonville,Ill.	K4 ..17.95	19.75
Cleveland,O.	A7 ..17.85	....
Crawfordsville,Ind.	M8 17.95	19.80††
Fostoria,O.	S1 ..18.35	19.90†
Houston,Tex.	S5 ..18.10	19.65**
Jacksonville,Ind.	M8 17.95	19.80††
Johnstown,Pa.	B2 ..17.85	19.65§
Kan.City,Mo.	S5..18.10	....
Kokomo,Ind.	C16 ....17.25	18.80††
Minnequa,Colo.	C10..18.10	19.65**
Pitm'r,Mass.	W12 18.15	19.70†
Pitts.,Calif.	C11..18.20	19.75†
S.SanFran.	C10..18.20	19.75**
SparrowsPt.,	B2..17.95	19.75§
Sterling(37)	N15 17.25	19.05††
Waukegan	A7 ..17.85	19.40†
Worcester	A7 ..18.15	....

WIRE, Merchant Quality (6 to 8 gage) An'ld Galv.

Ala.City,Ala.	R2..9.00 9.55**
Aliquippa	J5 ....8.65 9.325§
Atlanta(48)	A11..9.10 9.775§
Bartonville(48)	K4 9.10 9.775
Buffalo	W12 ....9.00 9.55†
Cleveland	A7 ....9.00 ....
Crawfordsville	M8..9.10 9.80††
Donora,Pa.	A7 ....9.00 9.55†
Duluth	A7 ....9.00 9.55†
Fairfield	T2 ....9.00 9.55†
Houston(48)	S5 ..9.25 9.80**
Jacks'vle,Fla.	M8..9.10 9.80††
Johnstown	B2(48) 9.00 9.675§
Joliet,Ill.	A7 ....9.00 9.55†
Kans.City(48)	S5 9.25 9.80**
Kokomo(48)	C16 ..9.10 9.65†
LosAngeles	B3 ..9.95 10.625§
Monessen	P7(48)..8.65 9.35§
Monessen	P7(48) 8.65 9.325§
Palmer,Mass.	W12 9.30 9.85†
Pitts.,Calif.	C11..9.95 10.50†
Rankin,Pa.	A7 ....9.00 9.55†
S.Chicago	R2 ....9.00 9.55**
S.SanFran.	C10..9.95 10.50**
SparrowsPt.	B2(48) 9.10 9.775§
Sterling(48)	N15 9.25 9.925††
Sterling(1)	(48) 9.15 9.825††
Struthers,O.	Y1 ....9.00 9.65†
Worcester,Mass.	A7 9.30 9.85†

Based on zinc price of: *13.50 †5c ‡10c. §11.50c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter ..	53.0
3¼ in. thru 6 in. ..	47.0
Longer than 6 in. ..	33.0
⅝ in. 3 in. & shorter	44.0
3¼ in. thru 6 in. ..	37.0
Longer than 6 in. ..	27.0
⅝ in. thru 1 in:	
6 in. and shorter ..	33.0
Longer than 6 in. ..	27.0
1⅛ in. and larger:	
All lengths	27.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter ..	53.0
3¼ in. thru 6 in. ..	47.0

Machine Bolts, Hot Galvanized
(Square & Hex. Full & Undersize Body)

½ in. and smaller:	
3 in. and shorter ..	38.0
3¼ in. thru 6 in. ..	29.0
Longer than 6 in. ..	15.0
⅝ in. 3 in. and shorter	27.0
3¼ in. thru 6 in. ..	17.0
Longer than 6 in. ..	10.0
⅝ in. thru 1 in.:	
6 in. and shorter ..	18.0
Longer than 6 in. ..	7.0
1⅛ in. and larger:	
All lengths	7.0

Carriage, Plow & Lag Bolts, Hot Galvanized

½ in. and smaller:	
6 in. and shorter ..	28.0
Larger diameters and longer lengths ...	13.0

Carriage Bolts
Full Size Body (cut thread) & Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter ..	46.0
Larger diameters and longer lengths	32.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter ..	46.0
Larger diameters and longer lengths	32.0

NUTS
(Container quantities and over)

Square Nuts, Reg. & Heavy:	
All sizes	56.0
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	41.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:	
⅜ in. and smaller..	62.0
⅞ in. to 1½ in.. incl.	56.0
1⅝ in. and larger..	51.5
Hex Nuts, Semifinished, Heavy (Incl. Slotted):	
⅜ in. and smaller..	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger..	51.5
Hex Nuts, Finished (Incl. Slotted and Castellated):	
⅞ in. and smaller..	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger..	51.5
Semifinished Hex Nuts, Reg. (Incl. Slotted):	
⅝ in. and smaller..	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger..	51.5

CAP AND SETSCREWS
(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:	
6 in and shorter:	
¾ in. and smaller..	35.0
⅞ in. and 1 in. ...	16.0
Longer than 6 in.:	
¾ in. and smaller..	3.0
⅞ in. and 1 in. ...	+11.0
High Carbon, Heat Treated:	
6 in. and shorter:	
⅝ in. and smaller..	20.0
¾ in. ⅞ in. and 1 in. ...	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller..	+19.0
¾ in. ⅞ in. and 1 in. ...	+39.0
Flat Head Capscrews:	
¾ in. and smaller, 6 in. and shorter ..	+85.0
Setscrews, Square Head, Cup Point, Coarse Thread:	
Through 1 in. diam.:	
6 in. and shorter...	+ 5.0
Longer than 6 in. ..	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in. larger 12.85
⅞ in. and smaller by 6 in. and shorter: 15.0%

PRESTRESSED STRAND

(High-strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Strand Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$32.15	$48.20	$61.55	$81.10	$105.65
Buffalo W12	32.15	48.20	61.55	81.10	105.65
Cleveland A7	32.15	48.20	61.55	81.10	....
KansasCity,Mo. U3	32.15	48.20	61.55	81.10	105.65
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	32.15	48.20	61.55	81.10	105.65
Pittsburg,Calif. C11	....	48.20	61.55	81.10	....
Pueblo,Colo. W12	32.15	48.20	61.55	81.10	105.65
Roebling,N.J. R5	32.15	48.20	61.55	81.10	105.65
St.Louis,Ill. L8	32.15	48.20	61.55	81.10	105.65
Waukesha,Wis. A7	32.15	48.20	61.55	81.10	105.65

RAILWAY MATERIALS

	Standard		Tee Rails	
Rails	No. 1	No. 2	All No. 2	60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.50
Johnstown,Pa., B2	....	....	....	(16)6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.22
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	7.025
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn. base.
(22) Deld San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.875c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld in mill zone or within switching limits, 5.885c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

ARTIST'S INTERPRETATION

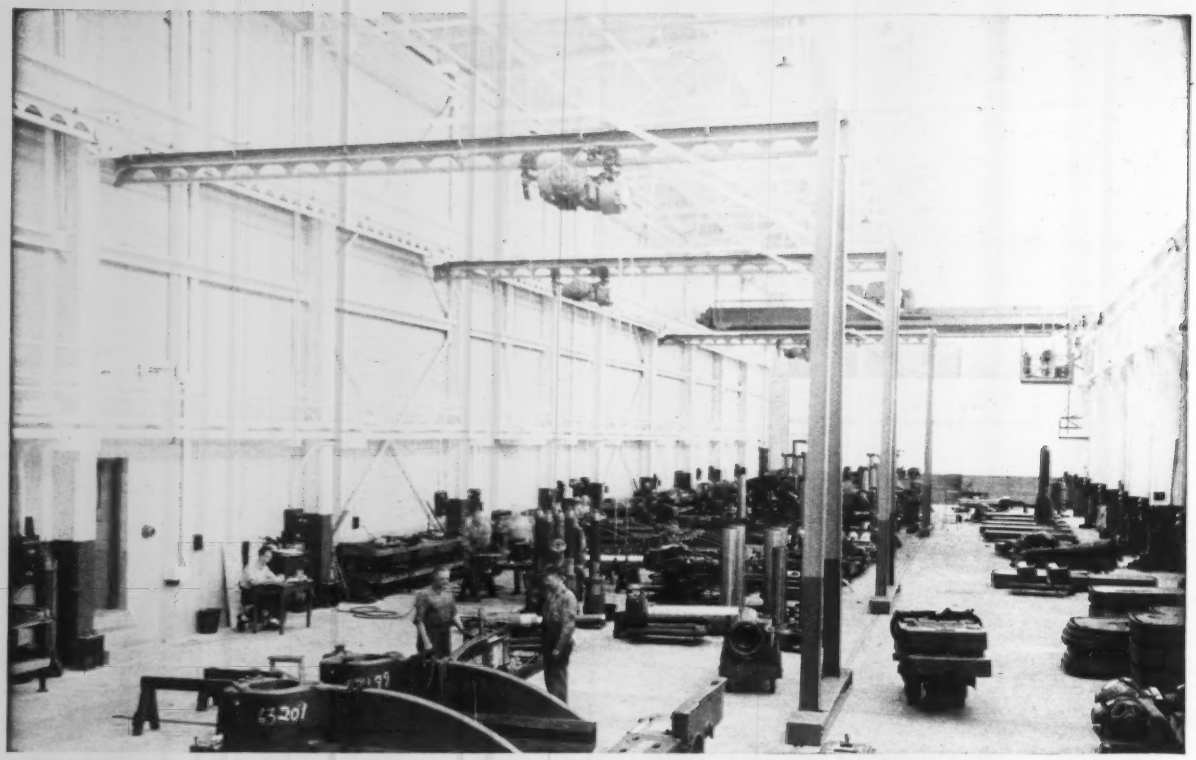
There is no substitute for Stainless steel

in outer space

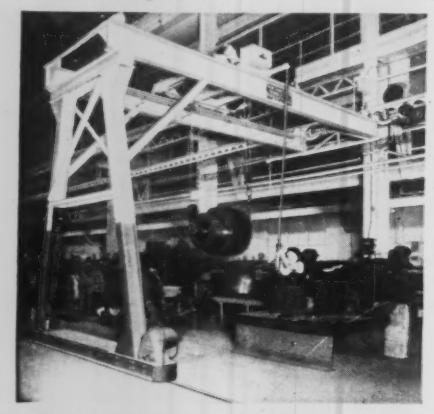
From the intense cold of outer space to the heat of a jet engine, Stainless Steel is the one metal that will stand up. In rockets, missiles and supersonic aircraft, Stainless Steel resists heat, friction, and corrosion, has a high strength to weight ratio and maintains its structural integrity under the most severe conditions.

Specify McLouth high quality sheet and strip Stainless Steel. McLouth Steel Corporation, Detroit 17, Michigan.

McLOUTH STAINLESS STEEL



Single bridge, hand-propelled gantries with electric hoists operating under heavy overhead crane in a machine tool plant.



Double girder, completely motorized gantry. Because gantries ride on a floor rail and one wall rail, their use often eliminates need of long span overhead cranes.

GANTRY CRANES BOOST PRODUCTION

IT is not unusual for skilled workers to wait 5 or 10 minutes and more in many shops for crane service. By providing a sufficient number of gantry cranes, much or all of this lost time can be eliminated and production aided.

Efficiency usually can be greatly improved by providing one large overhead crane for each shop bay — for the heavy lifting and transportation from one end of bay to the other — and a number of gantries to work under it, to do the light local or spot handling.

Several Cleveland Tramrail gantries generally can be purchased for the price of a large overhead crane and are available for manual or electric operation.

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BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7809 EAST 284th STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	0.5	+26	+11.5	+35	+22	+43.5	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on current price of zinc (11.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	40.00	42.00	39.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	40.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	41.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	42.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	44.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	45.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	45.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	53.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	46.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	55.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	66.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	87.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	87.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	71.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	79.50	89.25	89.25
317	48.00	60.00	76.75	88.25	86.25	90.75	88.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	54.75	65.50	65.50
330	....	....	118.75	....	132.00	138.50	135.50	149.25	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	64.75	79.25	79.25
403	....	....	28.25	....	32.00	33.75	30.00	40.25	40.25
405	19.50	25.50	29.75	36.00	33.50	35.25	32.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	30.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	31.25	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	40.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	31.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	31.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	41.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates: Carbon Base 5%	10%	15%	20%	Sheets: Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	34.75	40.65

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W Hot Wk. (H-21)	1.425-1.44
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.25	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B3, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66 00		66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	68.00	68.50	69.00	
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	67 50	68.00	68.50	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50		....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50		....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% and $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[8]	Structural Shapes	Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	8.64	8.89	10.99
Boston	9.31	10.40	11.39	53.50	9.73	10.11	13.39#	15.71	10.01	10.02	11.87
Buffalo	8.25	9.60	11.30	55.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.50	53.00	8.51	8.99	9.15	15.05	9.15	8.89	10 20
Cincinnati	8.43	9.51	10.55	53.43	8.83	9.31	11.53#	15.37	9.58	9.27	10.53
Cleveland	8.36	9.54	10.20	52.33	8.63	9.10	11.25#	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	10.87	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.20	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	8.70[3]	10.80[3]	12.15[3]	57.60	9.15	9.10[2]	12 95[2]	16.35	9.00[3]	9.10[3]	11.30[3]
Memphis, Tenn.	8.55	9.80	10.45	....	8.58	9.32	11.96#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	10.64	....	8.65	9.13	9.39	15.19	9.22	9.05	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.20	9.25	11.34	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.00**
Pittsburgh	8.35	9.55	10.85	52.00	8.61	8.99	11.25#	15.05	9.00	8.89	10.20
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.63	9.83	10.88	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	10.71	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.00	55.10	9.75	10.15	13.00	16.00	9.85	10.00	12.00
Seattle	8.70	10.30[2]	10.95[3]	55.02	8.75	8.85	14.70	16.80[3]	8.55	8.45	10.85
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.20	57.38	10.00	10.10	14.70	16.80	9.80	9.70	12.10
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡¾ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [2]—30,000 lb; [3]—1000 to 4999 lb; [8]—1000 to 1999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $168; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $253; Philadelphia, Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $310.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $350.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Nario, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $29-$31, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $26.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic concentrates	62-64% 18.00-19.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom
Brazilian iron ore, 68.5%	26.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$8.00-8.50*
Domestic, concentrates f.o.b. milling points	17.00-22.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included) $1.10 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00

South African Transvaal

44% no ratio	22.00-23.00
48% no ratio	29.00-31.00

Turkish

48% 3:1	51.00-55.00

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: deld. east of Mississippi River, ocean bags 23,000 lb and over	10.50
f.o.b. Riverton or Camden, N. J., west of Mississippi River.	9.50
Sponge Iron, Domestic, 99 + % Fe: Deld. east of Mississippi River. 23,000 lb and over	10.50
Electrolytic Iron, Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500-lb drum, freight allowed Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	31.50-47.00†
Bronze, 5000-lb lots	47.30-51.50†
Copper: Electrolytic	14.75*
Reduced	14.75*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	74.00
Nickel-Silver, 5000-lb lots	49.00-53.70†
Phosphor-Copper, 5000-lb lots	59.30
Copper (atomized) 5000-lb lots	39.80-48.30†
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.00*
Zinc, 5000-lb lots	18.50-31.70‡

Tungsten:	Dollars
Melting grade, 99% 60 to 200 mesh, nominal: 1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.45
Saginaw, Mich., deld.	34.03
Erie, Pa., ovens	30.50
Everett, Mass., ovens: New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.18
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Ore within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.05	$5.05	$4.95	$5.40
Bar Size Angles	5.05	5.05	5.00	5.38
Structural Angles	5.05	5.05	5.05	5.38
I-Beams	5.11	5.11	5.11	5.45
Channels	5.11	5.11	5.11	5.45
Plates (basic bessemer)	6.62	6.62	6.62	6.94
Sheets, H.R.	8.20	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.71	25.59	25.59	26.46
Barbed Wire (†)	6.65	6.65	6.65	7.00
Merchant Bars	5.40	5.40	5.35	5.90
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.05	5.18	5.00	5.35
Wire Rods, O.H. Cold Heading Quality No. 5	5.80	5.93	5.75	6.05
Bright Common Wire Nails (§)	8.02	8.02	7.92	8.20

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	31.00‡
Toluene, one deg (deld.)	25.00*
Industrial xylene	29.00§

Per ton, bulk, ovens

Ammonium sulfate	$32.00-35.00†

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Effective: *Apr. 12; †July 1; ‡July 8; §Aug. 12.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa., 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%), Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 7% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 38c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload packed, SM x D, 21.25c per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si. 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ½" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered, Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 5% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Contract, carload, lump, bulk, 14.6c per lb of contained Si. Packed c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca), C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing min 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c

BORON ALLOYS

Ferroboron: 100 lb or more packed, (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered, Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 55c per lb; Grade B (14-18% B) $1.20 Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Contract, lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered, Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅜ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Contract, carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb, f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%, 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4 per lb of contained Cb; less ton lots $4.05 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.80 per lb of contained Cb plus Ta, delivered; less ton lots $3.85 (nominal).

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered, Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

Think carefully: Have you seen this man anywhere around your plant?

His name is WILLIS JOSEPH HAMILTON, and he's

WANTED FOR MURDER

WILLIS JOSEPH HAMILTON is being sought by the FBI for unlawful flight to avoid prosecution for the crime of murder. Hamilton has been employed in foundries and by manufacturers of steel products, and may seek employment or already be employed in such industries.

On June 26, 1953, Hamilton is alleged to have shot and killed one William H. Goolsby in a Cleveland, Ohio, restaurant following an argument over the payment of a check. A complaint was filed before a U.S. Commissioner at Cleveland, Ohio, June 29, 1953, charging Hamilton with a violation of Title 18, U.S. Code, Section 1073, in that he fled from the State of Ohio to avoid prosecution for the crime of murder.

Hamilton uses several aliases: Joe Brown, Thomas Collins, Jimmie Dale, Willie Foster, William Hamilton, Willie Hamilton, John Tabot, Joe Talbert, John Talbert, Joseph J. White, James Williams, John Williams, Joseph Whyte, Joe Whyth.

This fugitive has escaped from confinement on numerous occasions. He reportedly carries a .45 caliber automatic under his left shoulder in a shoulder holster. He reportedly practices drawing this automatic while pretending to reach for cigarets. He reportedly has another automatic pistol in his possession. Accordingly, he should be considered armed and dangerous. Hamilton has been convicted for robbery, highway robbery, armed robbery, and breaking and entering to commit a misdemeanor. Fugitive was born April 16, 1902, St. Augustine, Florida; height, 5'7"; weight, 160 lbs.; build, medium; hair, black graying, kinky; eyes, brown; complexion, medium brown; race, Negro; nationality, American. Occupations, laborer, steel foundry worker, chauffeur. Scars and marks: small cut scar running into and above right eye; small cut scar above left eye; cut scar right edge of nose; 1" scar left side of face near ear. Has several gold-capped teeth, large vaccination outside upper left arm, large cut scar on back of right hand near base of index finger. Hamilton is said to drink to excess and has an ungovernable temper. He is an accomplished trumpet player and occasionally wears a mustache.

Any person having information which might assist in locating this fugitive is requested to immediately notify the Director of the Federal Bureau of Investigation, United States Department of Justice, Washington 25, D. C., or the SPECIAL AGENT IN CHARGE OF THE NEAREST FBI DIVISION. . . . the telephone number is on the first page of your local telephone directory.

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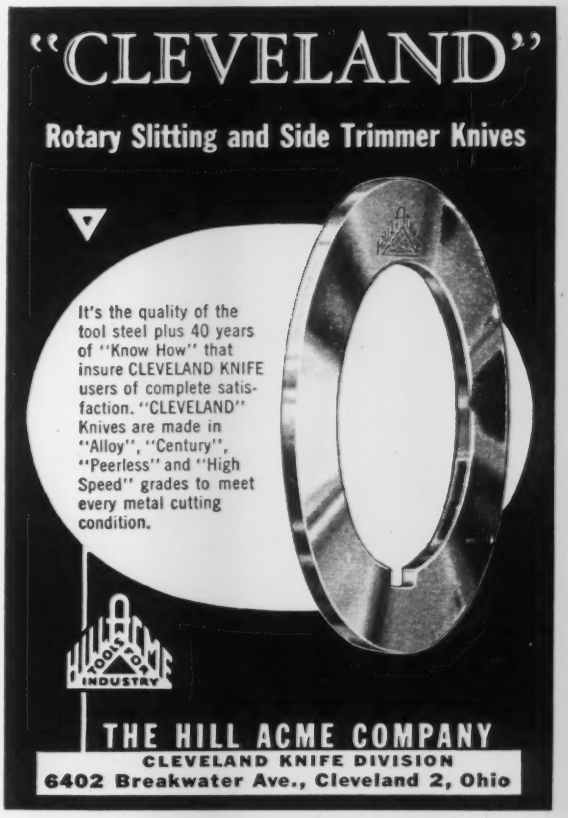
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Scrapmen Hope To Get Out of Rut

STEEL's composite on prime grades holds unchanged at $42.33 for third straight week. Dealers bank on higher steel operations to stimulate buying soon

Scrap Prices, Page 134

Pittsburgh — Steelmakers' preference for hot metal over scrap at current prices ($43-$45 a ton for No. 1 heavy melting) is increasingly evident. Although they're continuing to boost their ingot output, major producers show little interest in scrap brokers' offerings. Prices are firm but unchanged. There's little chance of an upturn until steel operations reach 80 to 85 per cent of capacity, observers believe.

Chicago — Lack of demand is keeping the market static, a condition that seems likely to hold through the rest of this month. Only one district mill is taking material, but only in amounts so small that over-all supplies aren't dented. With metalworking plants stepping up their use of steel, scrap generation is increasing to the point of surplus.

Philadelphia—Prices are unchanged, but they are firm. Domestic trading is moderate. Nothing is in prospect in the export market here for the next three or four weeks.

Cleveland — Because of inactive demand for steelmaking dealer scrap, prices are unchanged at $39.50-$40.50 for No. 1 heavy melting. The mills are depending largely on industrial grades and are sustaining increased open hearth melts with more blast furnace hot metal. The volume of auto production scrap is giving rise to fears of excess supply. Foundry scrap is moving steadily, but prices are unchanged with No. 1 cupola $44-$45.

Buffalo—Softness is reported in railroad scrap and low phos due to lack of buying. Low phos is down $2, now being quoted $42. Rail crops and random length rails also are off $2. Other scrap prices are unchanged, and there is little pressure on the market.

Detroit—A little strength is slowly developing in the scrap market here. Out-of-town brokers are expected to move into the area with larger purchases, but they have not done so yet, though some paper transactions among Detroit and Cleveland interests are reported. The small tonnages involved were not large enough to set a price trend.

Cincinnati — Brokers' buying prices are unchanged, but a more optimistic note is being sounded in the market as the district steelmaking rate moves above 80 per cent of capacity for the first time this year.

New York—Catching up a bit on export demand, and finding domestic inquiry none too pressing, domestic brokers have reduced their buying prices on some open hearth grades. They are now offering

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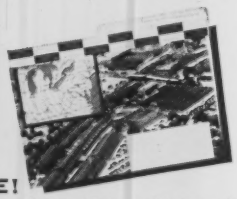

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STEELMAKING SCRAP PRICE COMPOSITE
Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania—Compiled by STEEL.
1957
1958
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
Oct. 22 1958 $42.33
Week Ago $42.33
Month Ago $43.00
Year Ago $36.83
Sept. Avg. $42.87

$32-$33 for No. 1 heavy melting and No. 1 bundles, and $29-$30 for No. 2 heavy melting.

In the stainless scrap specialties, demand is stronger and prices have been raised on 18-8 sheets, strip and solids to $190-195, and on Type 410 to $65-$70, an increase of $5 in each case.

St. Louis—The market is firm. As the steel operating rate rises, brokers anticipate a pickup in demand for scrap. Normally, other area markets move up first. Based on present demand, supplies are adequate, but new tonnage is not moving into dealers' yards in heavy volume.

Birmingham — Local dealers appear to be "sitting out" the lull in the market. Brokers say some dealers have accepted only half as many orders as they could have taken in recent weeks, declining to move large tonnage at current price levels.

The cast scrap market is active, but prices are unchanged.

San Francisco — Although steel mill operations are high for the year to date, little additional activity has developed in the scrap market. The forecast: Unchanged prices through the remainder of this year.

Seattle—The scrap market is drifting, prices pointing in no particular direction. Sales are at low ebb and insufficient to provide a thorough test of strength. As a result, quotations are largely nominal. Export demand is quiet. While a few lots have been moved, volume is insignificant compared with Japanese purchases in early 1957.

Canada . . .

Canadian buyers are increasing their purchases of U. S. steel; some are ordering sufficient tonnage to cover their requirements the remainder of this year.

With no sign of a break in the strike at the plant of the Steel Co. of Canada, Hamilton, Ont., and a generally quickening industrial pace —particularly in the U. S.—many Canadian companies feel it would be foolhardy to delay placing orders any longer. Up until the last couple of weeks they have tended to hold back orders, hoping for a settlement of the Stelco strike.

Structural Shapes . . .

Structural Shape Prices, Page 121

Structural steel demand is slower than it was. With more tonnage being fabricated than is being booked, shop backlogs are tapering. Even the larger fabricators are beginning to feel the pinch. They can now handle new work within two to three months.

Highway work, including bridges, and other types of public construction continue to be the market's chief support.

Estimates on about 10,000 tons for bridges in Connecticut will be out this quarter. Included is a river crossing at Seymour. Preliminary plans for northern New England projects are out. The work is expected to start next spring.

Steel Shipments by Markets—August, 1958

(All grades; net tons)

Markets	—August Shipments— 1958	1957	—First Eight Months— 1958	1957
Converting, processing	221,545	282,331	1,816,162	2,504,164
Forging (except auto)	56,682	81,322	459,708	782,178
Bolts, nuts, etc.	72,843	80,963	480,702	767,092
WAREHOUSES:				
Oil & gas	83,074	184,297	614,860	1,736,763
All other	824,235	969,920	6,222,975	8,873,010
Total warehouse	907,309	1,154,217	6,837,835	10,609,773
CONSTRUCTION:				
Rail transportation	2,807	7,767	30,157	46,435
Oil & gas	198,918	298,933	1,485,256	2,395,845
All other	541,246	731,275	4,353,028	6,161,288
Total construction	742,251	1,037,975	5,868,441	8,603,568
Contractors' products	288,213	265,275	2,226,542	2,425,600
AUTOMOTIVE:				
Cars, trucks, parts	759,683	1,011,038	5,358,062	9,006,502
Forgings	23,395	30,323	154,358	224,364
Total automotive	783,078	1,041,361	5,512,420	9,230,866
RAIL TRANSPORTATION:				
Rails, track, etc.	36,423	89,261	429,434	1,175,609
Cars, locomotives	38,379	205,430	547,494	1,939,174
Street cars, etc.	1,731	3,742	14,616	25,959
Total transportation	76,533	298,433	991,544	3,140,742
Shipbuilding	69,096	108,480	559,795	807,262
Aircraft	4,470	7,275	38,595	79,577
Oil & gas drilling	22,437	48,792	192,059	528,219
Mining, quarrying, etc.	15,106	22,445	120,187	237,041
AGRICULTURAL:				
Machinery	64,368	63,510	576,389	594,798
All other	33,219	14,212	193,276	132,394
Total agricultural	97,587	77,722	769,665	727,192
Machinery, tools, etc.	230,150	330,512	1,948,843	3,289,206
Elec. machinery, etc.	133,101	161,465	1,110,159	1,471,810
Appliances, utensils	126,758	105,189	914,678	1,023,031
Other domestic equipment	140,363	143,667	1,076,047	1,281,872
CONTAINERS:				
Cans & closures	490,684	419,855	3,672,470	3,706,819
Barrels, drums	63,518	65,718	503,518	600,571
All other	48,150	47,920	311,364	429,624
Total containers	602,352	533,493	4,487,352	4,737,014
Ordnance, other military	23,806	27,204	170,921	278,787
Nonreported tonnage	58,361	59,630	434,389	588,342
Exports	162,982	362,102	1,602,326	3,279,378
Total shipments	4,835,023	6,229,853	37,618,370	56,392,714

Data from American Iron & Steel Institute.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Oct. 22, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 22	$42.33
Oct. 15	42.33
Sept. Avg	42.87
Oct. 1957	37.37
Oct. 1953	32.75

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	34.00-35.00
No. 1 dealer bundles	43.00-44.00
No. 2 bundles	31.00-32.00
No. 1 busheling	43.00-44.00
No. 1 factory bundles	47.00-48.00
Machine shop turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals:	
2 ft and under	47.00-48.00
3 ft lengths	46.00-47.00
Heavy turnings	34.00-35.00
Punchings & plate scrap	47.00-48.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Stove plate	41.00-42.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	39.00-40.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Random rails	54.00-55.00
Railroad specialties	52.00-53.00
Angles, splice bars	52.00-53.00
Rails, rerolling	60.00-61.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	50.00-52.00

CHICAGO

No. 1 hvy melt, indus.	43.00-45.00
No. 1 heavy melt, dealer	40.00-41.00
No. 2 heavy melting	34.00-35.00
No. 1 factory bundles	45.00-46.00
No. 1 dealer bundles	41.00-42.00
No. 2 bundles	28.00-29.00
No. 1 busheling, indus.	43.00-45.00
No. 1 busheling, dealer	40.00-41.00
Machine shop turnings	21.00-22.00
Mixed borings, turnings	23.00-24.00
Shor. shovel turnings	23.00-24.00
Cast iron borings	23.00-24.00
Cut structurals, 3 ft	46.00-47.00
Punchings & plate scrap	47.00-48.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	43.00-44.00
Unstripped motor blocks	37.00-38.00
Clean auto cast	51.00-52.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R. R. malleable	55.00-56.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Angles, splice bars	54.00-55.00
Axles	67.00-68.00
Rails, rerolling	*62.00*

Stainless Steel Scrap

18-8 bundles & solids	215.00-220.00
18-8 turnings	120.00-125.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	30.00-31.00
No. 1 busheling	43.00-44.00
No. 1 bundles	43.00-44.00
No. 2 bundles	30.00-31.00
Machine shop turnings	15.00-16.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	45.00-46.00
Electric furnace bundles	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00

CLEVELAND

No. 1 heavy melting	39.50-40.50
No. 2 heavy melting	26.00-27.00
No. 1 factory bundles	44.00-45.00
No. 1 bundles	39.50-40.50
No. 2 bundles	30.50-31.50
No. 1 busheling	39.50-40.50
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Mixed borings, turnings	20.00-21.00
Cast iron borings	20.00-21.00
Cut foundry steel	40.00-41.00
Cut structurals, plates 2 ft and under	47.00-48.00
Low phos. punchings & plate	41.00-42.00
Alloy free, short shovel turnings	22.00-23.00
Electric furnace bundles	40.50-41.50

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	37.00-38.00
Heavy breakable cast	36.00-37.00
Stove plate	43.00-44.00
Unstripped motor blocks	32.00-33.00
Brake shoes	36.00-37.00
Clean auto cast	49.00-50.00
Burnt cast	33.00-34.00
Drop broken machinery	49.00-50.00

Railroad Scrap

R.R. malleable	60.00-61.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Rails random lengths	52.00-53.00
Cast steel	49.00-50.00
Railroad specialties	50.00-51.00
Uncut tires	43.00-44.00
Angles, splice bars	50.00-51.00
Rails, rerolling	56.00-57.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	200.00-210.00
18-8 turnings	110.00-115.00
430 clips, bundles, solids	100.00-110.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)†

No. 1 heavy melting	37.00
No. 2 heavy melting	35.00
No. 1 bundles	39.00
No. 2 bundles	28.00
No. 1 busheling	39.00
Machine shop turnings	20.00†
Short shovel turnings	22.00†

Cast Iron Grades

No. 1 cupola	49.00
Charging box cast	40.00
Heavy breakable cast	38.00
Unstripped motor blocks	39.00
Clean auto cast	49.00
Stove plate	46.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.50
Rails, 18 in. and under	52.00†
Rails, random lengths	47.50
Rails, rerolling	62.25
Angles, splice bars	47.00

BIRMINGHAM

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	30.00-31.00†
No. 1 bundles	39.00-40.00
No. 2 bundles	25.00-26.00
No. 1 busheling	39.00-40.00
Cast iron borings	13.00-14.00
Machine shop turnings	24.00-25.00
Short shovel turnings	25.00-26.00
Bars, crops and plates	46.00-47.00
Structurals & plates	45.00-46.00
Electric furnace bundles	40.00-41.00
Electric furnace:	
2 ft and under	38.00-39.00
3 ft and under	37.00-38.00

Cast Iron Grades

No. 1 cupola	54.00-55.00
Stove plate	54.00-55.00
Unstripped motor blocks	43.00-44.00
Charging box cast	29.00-30.00
No. 1 wheels	43.00-44.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	*52.00-53.00*
Rails, rerolling	59.00-60.00
Rails, random lengths	48.00-49.00
Angles, splice bars	48.00-49.00

PHILADELPHIA

No. 1 heavy melting	41.00
No. 2 heavy melting	37.00
No. 1 bundles	41.00
No. 2 bundles	25.00
No. 1 busheling	41.00
Electric furnace bundles	43.00
Mixed borings, turnings	20.00-21.00†
Short shovel turnings	24.00-25.00†
Machine shop turnings	20.00-21.00†
Heavy turnings	34.00-35.00†
Structurals & plate	44.00-45.00
Couplers, springs, wheels	48.00
Rail crops, 2 ft & under	58.00-60.00

Cast Iron Grades

No. 1 cupola	41.00
Heavy breakable cast	43.00
Malleable	58.00
Drop broken machinery	49.00-50.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	19.00-20.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Short shovel turnings	14.00-15.00
Low phos. (structurals & plates)	37.00-38.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	28.00-29.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	*190.00-195.00*
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	*65.00-70.00*
430 sheets, clips, solids	85.00-90.00

BUFFALO

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	29.00-30.00
No. 1 bundles	35.00-36.00
No. 2 bundles	27.00-28.00
No. 1 busheling	35.00-36.00
Mixed borings, turnings	17.00-18.00
Machine shop turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Cast iron borings	17.00-18.00
Low phos. structurals and plate, 2 ft and under	*41.00-42.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	44.00-45.00
No. 1 machinery	48.00-49.00

Railroad Scrap

Rails, random lengths	*51.00-52.00*
Rails, 3 ft and under	*57.00-58.00*
Railroad specialties	43.00-44.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.50-38.50
No. 2 heavy melting	32.50-33.50
No. 1 bundles	37.50-38.50
No. 2 bundles	25.00-26.00
No. 1 busheling	37.50-38.50
Machine shop turnings	18.00-19.00
Mixed borings, turnings	18.00-19.00
Short shovel turnings	20.00-21.00
Cast iron borings	18.00-19.00
Low phos. 18 in.	45.00-46.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Heavy breakable cast	36.00-37.00
Charging box cast	34.00-35.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	55.00-56.00
Rails, random lengths	49.00-50.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	40.00
No. 2 heavy melting	34.00
No. 1 bundles	40.00
No. 2 bundles	25.00
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	45.50

Cast Iron Grades

No. 1 cupola	47.00
Heavy breakable	30.00†
Foundry malleable	41.00
Unstripped motor blocks	37.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00†

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	23.00-24.00
No. 1 bundles	29.00-30.00
No. 2 bundles	17.00-18.00†
No. 1 busheling	29.00-30.00
Machine shop turnings	9.00-10.00
Short shovel turnings	12.00-13.00
No. 1 cast	33.00-34.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	36.00-38.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*20.00-21.00*
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*9.00-10.00*
Mixed borings, turnings	*12.00-13.00*
Short shovel turnings	*12.00-13.00*
Punchings & plate	*32.00-33.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	35.00-36.00
Charging box cast	36.00-37.00
Heavy breakable	*34.00-35.00*
Unstripped motor blocks	18.00-19.00
Clean auto cast	44.00-45.00

SEATTLE

No. 1 heavy melting	30.00†
No. 2 heavy melting	28.00†
No. 1 bundles	22.00†
No. 2 bundles	20.00†
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	31.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	23.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	28.00
No. 2 bundles	17.00
Machine shop turnings	11.00
Shoveling turnings	13.00
Cast iron borings	13.00
Cut structurals and plate 1 ft and under	45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	22.00
Machine shop turnings	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings	15.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

No. 1 heavy melting	30.00
No. 2 heavy melting	26.00
No. 1 bundles	30.00
No. 2 bundles	23.00
Mixed steel scrap	25.00
Mixed borings, turnings	15.00
Busheling, new factory:	
Prepared	30.00
Unprepared	24.00
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast	45.00-50.00

•Brokers' buying price.
†Nominal.
‡F.o.b. Hamilton, Ont.

There's a Proven Grade of

STEELGARD

REG. U.S. PAT. OFF.

RUST PREVENTIVE

For Every Metal

Manufacturers for years have found that STEELGARDS immediately and economically solve their rust problems because these very effective rust preventives stop rust two ways: (1) they supply the desired protective surface coating; (2) they arrest action under the surface coat.

STEELGARDS are a series of every conceivable type of rust preventive. The amount of STEELGARD deposited on the metal can be regulated by the type selected and the dilution used.

STEELGARDS . . .

1. **Are far superior to conventional oils, vaselines, petrolatums, waxes, greases.**
2. **Can be applied to wet or dry surfaces, inside or out, on metal to be covered or uncovered.**
3. **Adhere to all metals uniformly and continuously.**
4. **Are non-flammable, practically odorless.**
5. **Are non-staining in most grades.**
6. **Are applied by brush, spray, dipping.**
7. **Can be removed easily without special equipment.**
8. **Provide greater economy, stop waste and mess.**

STEELGARDS . . .

Are made for use on *all* metals including cast iron, cast steel, etc. Some produce invisible films which cannot be seen and which are not sensitive to the touch. Others produce oily coatings . . . some, dry waxy coatings. Others can be painted over without removal and some combine the properties of detergency along with reduced surface tension. Some burn off completely in annealing while others do not.

STEELGARDS are available in the type desired for water phase application. Other grades are used as received or cut back with solvents or mineral oils.

Write us on your letterhead about your rust problem. No matter how difficult, there's a proven grade of STEELGARD rust preventive to solve it.

HARRY MILLER CORP. HAMICO 4th & BRISTOL STREETS PHILADELPHIA 40, PA.

Manufacturers of
HAMIKLEER, ACTIVOL, HAMICOTE,
STEELGARD, IMMUNOL

HARRY MILLER CORP.

Original Products and Processes Since 1936

4th and BRISTOL STS., PHILA. 40, PA.

DAvenport 4-4000 *Service Representatives in Principal Cities*

Reynolds Shows Its Bridge

New version of all-aluminum structure is designed to compete with steel in the highway program. Officials claim competitive price. Copper sales improve. Aluminum output up

Nonferrous Metal Prices, Pages 138 & 139

ANOTHER company now hopes to capture a portion of the bridge construction market for aluminum.

Reynolds Metals Co. has unveiled its Reynolds-Baroni bridge, a prefabricated, all-aluminum unit that uses 10 lb of the light metal per square foot. It weighs only one-fourth as much as a comparable steel bridge, says Reynolds.

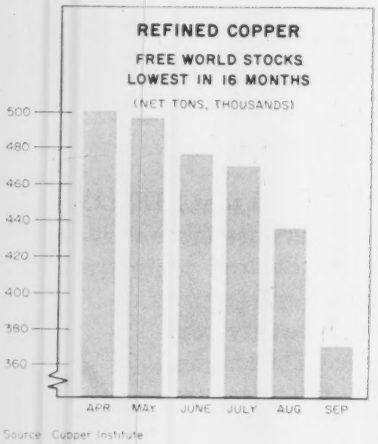
It is the second all-aluminum bridge to make its debut in recent weeks. In late August, the Fairchild bridge was introduced at Lehigh University (see STEEL, Sept. 1, p. 31).

• **Specifics** — The Reynolds-Baroni bridge consists of parallel parabolic arches stiffened by diaphragms. The 4-ft wide arches (modular sections) are joined side to side to form a continuous roadbed of any multiple width. There's no limit to length—sections between piers can be in excess of 100 ft. Arches and most other components are made of annealed 5083 sheets. Main structural joints are welded. Roadbed concrete (or asphalt) can be poured directly on the upper plate.

• **Installation**—Fully fabricated 4-ft wide sections will be shipped to a bridge site. The only on-the-job chore is to bolt the sections together and put the unit in place, says Reynolds. The company estimates that six to eight men using only a crane can erect a 24 by 100 ft bridge in less than a day.

• **Tests**—A 12 by 60 ft prototype is undergoing simulated field tests on the campus of New York University. It has held up after loadings equivalent to 400,000 consecutive passages of 38-ton trucks (representing 40 years of normal traffic), says Reynolds. Tests will be extended to 100 years of service.

• **Comparisons**—The Reynolds and Fairchild bridges offer more than substitute materials. Both are designed to take advantage of aluminum's characteristics. Both weigh about the same. But one observer claims the Reynolds bridge has these advantages: 1. It's less expensive to fabricate because of welded rather than riveted construction. 2. Design allows for more standardized construction from unit to unit. 3. Erection is faster.



Source: Copper Institute

The Alabama Highway Department plans to install a 234-ft aluminum bridge soon.

• **Potential** — Says J. Louis Reynolds, executive vice president: "At least 75,000 bridges of all sizes will be built under the Federal Highway Program in the next few years. A single 100-ft Reynolds-Baroni bridge carrying four lanes of traffic would use about 50,000 lb of aluminum."

Reynolds expects to license its bridges. As one company official put it: "We are in the aluminum business, not the bridge business."

Aluminum Output Climbs

By Nov. 1, the domestic primary aluminum industry will be producing at an annual rate of close to 1,778,000 tons. Recent announcements indicate producers plan to reactivate some of their capacity: Aluminum Co. of America, 48,000 tons at Pt. Comfort, Tex., and Massena, N. Y.; Reynolds Metals Co., 36,000 tons at Troutdale and Longview, Wash.; Kaiser Aluminum & Chemical Corp., 22,000 tons at Mead, Wash.

Copper Sales Up

Copper Institute statistics for September show a pickup (see graph). Domestic deliveries of refined copper to fabricators rose to 101,539 tons, the best month since January. Producers' stocks fell to 178,494 tons, the fourth straight month they've dropped. It's the lowest they have been since January. Refined production of 107,635 tons was up 7000 tons from the August figure.

The drop in Free World stocks noted in the graph resulted from lower refined production outside the U. S. and improved domestic shipments to fabricators.

NONFERROUS PRICE RECORD

	Price Oct. 22	Last Change	Previous Price	Sept. Avg	Aug. Avg	Oct., 1957 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	26.000
Copper	27.50–30.00	Oct. 20, 1958	27.50–28.50	26.428	26.510	26.361
Lead	12.80	Oct. 14, 1958	12.30	10.730	10.646	13.504
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	96.50	Oct. 22, 1958	96.875	94.120	94.995	91.843
Zinc	11.00	Oct. 8, 1958	10.50	10.000	10.000	10.000

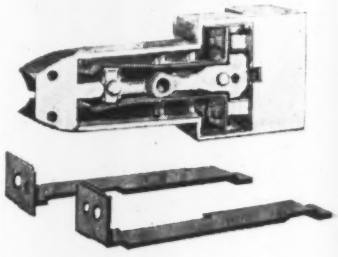
Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

CONTACT!

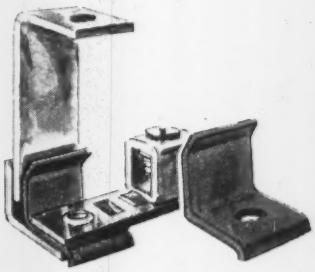
NEW "CONTACT BRONZE" STRIP KEEPS THE SPRING IN FORMED CONTACT PARTS, YET COSTS UP TO 25% LESS!

Manufacturers can now form intricate contact parts that cost less from Bridgeport's new "Contact Bronze" strip. High quality is maintained in this new, red color alloy strip by the addition of a minute quantity of phosphorus, which provides superior spring properties, even in hard-to-form parts.

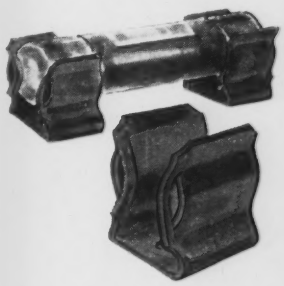
Specially engineered for the electronics industry, Bridgeport "Contact Bronze" Alloy 92 costs up to 25% *less* than metals previously used for this application. If you form or stamp shaped contact parts, learn how "Contact Bronze" can maintain quality at lower cost. Samples and a copy of the "Contact Bronze" data sheet are available from your nearest Bridgeport Sales Office. Call or write today!



These electrical terminals were originally made of phosphor bronze. Parts now are produced from Bridgeport "Contact Bronze" 92—at appreciable savings.



American Electric Switch Division, Clark Controller Co., Cleveland, Ohio, wanted a lower-cost material for pressure clips. Bridgeport "Contact Bronze" 92 met all specifications . . . good electrical conductivity to reduce heating, superior spring and mechanical properties—and all at lower cost.



A leading manufacturer of control switches needed these fuse clips with special mechanical and electrical properties. Bridgeport "Contact Bronze" 92 met the specifications—at lower cost.

matched Bridgeport Metals *to your job*

BRIDGEPORT BRASS

Bridgeport Brass Company, Bridgeport 2, Conn. • Sales Offices in Principal Cities. • In Canada: Noranda Copper and Brass Limited, Montreal

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 23.50-24.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb deld.

Cobalt: 97.99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 27.50 deld.; custom smelters, 30.00; lake, 27.50 deld.; fire refined, 27.25 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-80 nom. per troy oz.

Lead: Common, 12.80; chemical, 12.90; corroding, 12.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire, $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $233-237 per 76-lb flask.

Molybdenum: Unalloyed turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $15-17 per troy oz.

Platinum: $57-60 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 90.375 per troy oz.

Sodium: 17.00 c.l.; 19.00-19.50 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 96.50; prompt, 96.375.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.82-2.05; grade A-2 (0.5% Fe max.), $1.70-1.85 per lb.

Tungsten: Powder, 89.8%, carbon reduced, 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 13.50; No. 2, 13.75; No. 5, 13.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.50-25.25; No. 12 foundry alloy (No. 2 grade), 21.50-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 18.00.

Brass Ingot: Red brass, No. 115, 29.00; tin bronze, No. 225, 38.00; No. 245, 32.75; high-leaded tin bronze, No. 305, 33.25; No. 1 yellow, No. 405, 24.00; manganese bronze, No. 421, 25.75.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.87, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.85, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 32.855; l.c.l., 33.48. Weatherproof, 20,000-lb lots, 34.41; l.c.l., 35.16, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $18.50 per cwt; pipe, full coils, $18.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $8.50-15.95; sheared mill plate, $6.00-9.50; wire, $6.50-11.00; forging billets, $4.10-4.35; hot-rolled and forged bars, $5.25-6.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	....
0.136-0.096	43.20-48.30	....
0.126-0.103	....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	....
0.077-0.061	....	39.50-40.70
0.068-0.061	44.30-52.20	....
0.061-0.048	44.90-54.40	40.10-41.50
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.80	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.375	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam. 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard lengths, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ⅜ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-.30 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 23.75-24.25; No. 2 heavy copper and wire, 22.00-22.50; light copper, 19.75-20.25; No. 1 composition red brass, 17.50-18.00; No. 1 com-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 27.50c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	50.63b	47.86c	....	50.82	23.500	23.500	22.750
Yellow Brass	44.57	29.28d	45.11	47.48	18.000	17.750	15.250
Low Brass, 80%	47.03	46.97	47.57	49.84	20.000	19.750	19.250
Red Brass, 85%	47.89	47.83	48.43	50.70	20.750	20.500	20.000
Com. Bronze, 90%	49.30	49.24	49.84	51.86	21.625	21.375	20.875
Manganese Bronze	52.53	46.76	57.20	....	16.675	16.375	15.875
Muntz Metal	46.95	42.76	....	....	16.875	16.625	16.125
Naval Brass	48.84	43.15	55.90	52.00	16.625	16.375	15.875
Silicon Bronze	55.33	54.52	55.37	57.28	23.125	22.875	22.125
Nickel Silver, 10%	59.72	62.04	62.04	....	22.875	22.625	11.437
Phos. Bronze, A-5%	69.67	70.17	70.17	71.35	24.375	24.125	23.125

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 16.50-17.00; new brass clippings, 15.50-16.00; light brass, 12.00-12.50; heavy yellow brass, 13.00-13.50; new brass rod ends, 12.75-13.25; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 14.00-14.50; brass pipe, 14.25-14.75.

Lead: Heavy, 8.50-9.00; battery plates, 4.75-5.25; linotype and stereotype, 11.00-11.50; electrotype, 9.50-10.00; mixed babbitt, 9.50-10.00.

Monel: Clippings, 32.00-34.00; old sheets, 26.00-28.00; turnings, 20.00-23.00; rods, 32.00-34.00.

Nickel: Sheets and clips, 52.00-55.00; rolled anodes, 52.00-55.00; turnings, 37.00-40.00; rod ends, 52.00-55.00.

Zinc: Old zinc, 4.00-4.25; new diecast scrap, 3.75-4.00; old diecast scrap, 2.50-2.75.

Aluminum: Old castings and sheets, 9.25-9.75; clean borings and turnings, 6.25-6.75; segregated low copper clips, 13.00-13.50; segregated high copper clips, 12.00-12.50; mixed low copper clips, 12.75-13.25; mixed high copper clips, 11.50-12.00.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 10.00-10.50; segregated low copper clips, 16.50-17.00; segregated high copper clips, 15.50-16.00; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.00-15.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.50; clean borings and turnings, 10.00-10.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 14.50-15.00; mixed high copper clips, 13.00-13.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.50; light scrap, 48.50; turnings and borings, 33.50.

Copper and Brass: No. 1 heavy copper and wire, 22.00 nom.; No. 2 heavy copper and wire, 21.25 nom.; light copper, 19.00 nom.; refinery brass (60% copper) per dry copper content, 21.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.00 nom.; No. 2 heavy copper and wire, 21.25 nom.; light copper, 19.00 nom.; No. 1 composition borings, 20.50; No. 1 composition solids, 21.00; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 17.25.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45.
Copper: Flat-rolled, 44.29; oval, 42.50; 5000-10,000 lb; electrodeposited, 37.75; 2000-5000 lb lots; cast, 40.25; 5000-10,000 lb quantities.
Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.
Tin: Bar or slab, less than 200 lb, 114.50; 200-499 lb, 113.00; 500-999 lb, 112.50; 1000 lb or more, 112.00.
Zinc: Balls, 17.50; flat tops, 17.50; flats, 20.25; ovals, 19.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.
Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.90; 1000-19,900 lb, 61.90.
Copper Sulphate: 100-1900 lb, 14.30; 2000-5900 lb, 12.30; 6000-11,900 lb, 12.05; 12,000-22,900 lb, 11.80; 23,000 lb or more, 11.30.
Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.
Nickel Sulphate: 5000-22,000 lb, 29.00; 23,000-35,900 lb, 28.50; 36,000 lb or more, 28.00.
Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.
Sodium Stannate: Less than 100 lb, 76.30; 100-600 lb, 67.20; 700-1900 lb, 64.50; 2000-9900 lb, 62.60; 10,000 lb or more, 61.30.
Stannous Chloride (anhydrous): 25 lb, 151.40; 100 lb, 146.50; 400 lb, 144.00; 800-19,900 lb, 103.20; 20,000 lb or more, 97.10.
Stannous Sulphate: Less than 50 lb, 136.70; 50 lb, 106.70; 100-1900 lb, 104.70; 2000 lb or more, 102.70.
Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1500 tons, state bridgework, Philadelphia, through Buckley & Co., general contractor, to Joseph T. Ryerson & Son Inc., Philadelphia.
400 tons, building, Jefferson Medical College, Philadelphia, through John McShane, Philadelphia, general contractor, to Bethlehem Steel Co., Bethlehem, Pa.
275 tons, Central Cove High School, Martinsburg, Pa., to Goetz Welding Co., Harrisburg, Pa.
250 tons, Cherry Hill Inn, Haddonfield, N. J., through Wark Co., general contractor, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.
250 tons, Pennhurst Hospital, Pennhurst, Pa., to U. S. Steel Supply Div., U. S. Steel Corp., Pittsburgh.
235 tons, building, William Stuempfig Co., Philadelphia, to Belmont Iron Works, Eddystone, Pa.
194 tons, Montana State highway bridge, Shelby County, to an unstated fabricator.
120 tons, State Teachers College, Millersville, Pa., to Brocker Mfg. Co., York, Pa.

STRUCTURAL STEEL PENDING

6400 tons, approaches to the Woodrow Wilson Memorial Bridge, Washington, D. C.; Pittsburgh-Des Moines Steel Co., Pittsburgh, low bidder.
4400 tons, French Broad River Bridge, Jefferson and Cook Counties, Tennessee, Peter Kiewit Sons Co., Omaha, Nebr., general contractor.
600 tons, state bridgework, LR 67058 /3/, Roosevelt Boulevard, Philadelphia, Lipsett Inc., Philadelphia, low on the general contract.
435 tons, angles, General Stores Supply Office, Navy, Philadelphia; bids Nov. 5.
365 tons, bridge, Waterville-Oakland, Maine; bids Oct. 29, Augusta, Maine.
230 tons, state bridgework, LR 766 /LA-3/, schedule 1, Pittsburgh, bids Dec. 5; also, 86 tons of structural shapes.
150 tons, three-span state bridge, Kirby-Concord, Vt.; preliminary plans, Montpelier, Vt.; also 50 tons, reinforcing bars.
110 tons, one WF three-span bridge, Springfield, Vt., preliminary plans, Montpelier, Vt.; also, 45 tons, reinforcing bars.
110 tons, state highway bridge, Milton-South Hero, Vt.; preliminary plans, Montpelier, Vt.; also 50 tons, reinforcing bars.
105 tons, two composite WF single-span bridges, Manchester-Dorset, Vt.; preliminary plans, Montpelier, Vt.; also 50 tons, reinforcing bars.
100 tons or more, steel frame building, Rainier Branch, Seattle National Bank, Seattle; bids soon.
100 tons, bridge, Falmouth, Maine; bids Oct. 29, Augusta, Maine.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1540 tons, seven highway structures and pavement, Naugatuck, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Brunalli Construction Co., Southington, Conn., general contractor; 250 tons, highway mesh pending.
125 tons, Washington State, two girder underpasses, King County, to Northwest Steel Rolling Mills Inc., Seattle; Allen R. Anderson, Seattle, general contractor, low at $164,406.
153 tons, telephone exchange, Havre, Mont., to unstated St. Paul, Minn., fabricator.
120 tons, two highway structures, Yarmouth, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; W. H. Hinman Inc., North Anson, Maine, general contractor.
110 tons, state highway bridge, Winslow, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Ellis C. Snodgrass Inc., Portland, Maine, general contractor.

REINFORCING BARS PENDING

685 tons, also 85 tons of shapes, Prineville Dam project, Oregon State; general contract to Keystone Construction Co., Prineville, low at $2,614,944 by Bureau of Reclamation.
625 tons, state bridgework, LR 1026 IA, Allegheny County, Pennsylvania, bids Oct. 30; also, 2890 tons of structurals.

DEGREASERS

Model No. VM-325-2S DETREX SOLVENT DEGREASER. Steam operated, Conveyor Type. 10 ga. corrosion resistant steel. Capacity 2,000 lbs. of aluminum per hour. Variable Speed 11 to 22 ft. per min. Model No. S-60 Detrex Solvent Still including (2) 3 H.P. 1750 RPM Motors for Spray Pumps. Conveyor opening 18" x 24" weight 11,200 lbs. Overall dimension 38" long x 13½" high x 6½" wide

Price $6250.00

350 STEEL BASKETS, Rack Type Chrome Plated. **Price ..... $1.50 each**

THE ENTERPRISE ALUMINUM CO.
Massillon, Ohio **Phone: TEmple 2-4785**

WILL INVEST
Up to $1,000,000. Worth of
PRESSES

In well rated US or foreign metalworking manufacturing firm.
Box No. 697, STEEL
Penton Bldg. Cleveland 13, Ohio

PERSONNEL WANTED
for
SMALL MERCHANT & RE-BAR ROLLING MILL AND MELT PLANT

Mill now being built in Fairbanks, Alaska, and will be in operation in April, 1959. Mill will roll mainly reinforcing bars and will produce during the months of April through October, but key personnel will be compensated on an annual basis.

Personnel inquiries requested for melters, chemists, rollers, superintendents, managers and lesser related positions. Please enclose full particulars, including picture and reference, in first letter to

ALASKA STEEL MILLS, INC.
7707-7th Ave. So.
Seattle, Washington

CLASSIFIED

ACCOUNT WANTED
Have been acting as factory representative eleven years. With associate call on major industrials, jobbers and wholesale hardware concerns in Ohio and Indiana. Have had ten years mill experience in cold finished steel. Now handling two accounts. Could devote time to an additional line. Reply Box 609, STEEL, Penton Bldg., Cleveland 13, Ohio.

Help Wanted

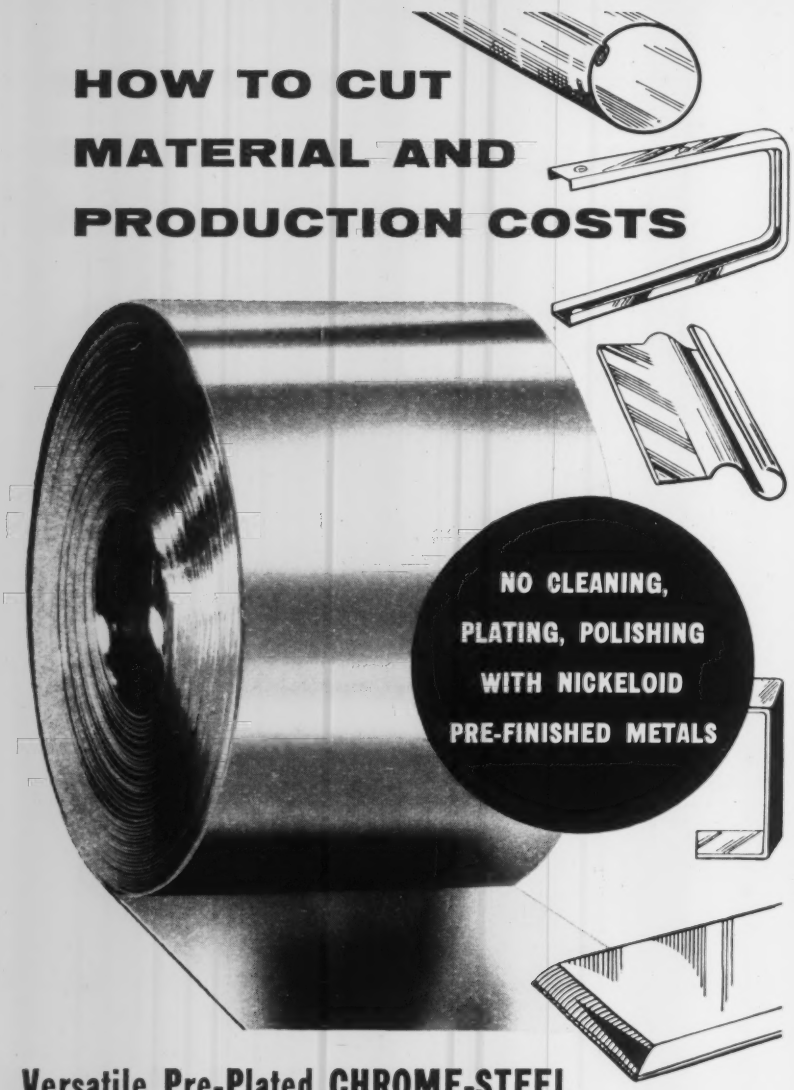
PLANT SUPERINTENDENT
Superintendent for immediate opening in medium sized structural steel fabrication shop in Baltimore. Must have experience as superintendent or assistant superintendent in structural steel shop. Experience must include knowledge of shop machines and techniques. Send complete resume and salary requirements to Box 696, STEEL, Penton Bldg., Cleveland 13, Ohio. All replies held in strict confidence.

Positions Wanted

SALES REPRESENTATIVE, seasoned in industrial sales with production and non-productive purchasing background as buyer for one of the Big Three; desires to represent reliable line to automotive, etc. Write Box 698, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR CLASSIFIED RATES
And Further Information write
STEEL, Penton Bldg., Cleveland 13, O.

HOW TO CUT MATERIAL AND PRODUCTION COSTS



Versatile Pre-Plated CHROME-STEEL and NICKEL-STEEL Now Available in Three Grades

Cut costs! — Reduce production steps! The *need* was never greater: the *method* never surer than with Nickeloid chrome-steel and nickel-steel . . . now available in C-grade, *a new low-cost utility grade* for applications that don't require the quality of our A and B grades. These cost-cutting design materials are *pre-finished* — eliminate extra handling, cleaning, racking and polishing costs, plus actual plating costs. So versatile — adaptable to standard production methods, too! Their beautiful durable finishes can add so much in sales and utility value to your products at very low cost. Cut costs, reduce production steps with Nickeloid chrome-steel or nickel-steel — big 24" wide coils, sheets, strips: bright and satin finishes. Now save even more with new low-cost C-grade!

NICKELOID METALS SINCE 1898 NM

Write For More Information

AMERICAN NICKELOID COMPANY

PERU 1, ILLINOIS

MILLS — Peru, Illinois and Walnutport, Pennsylvania

Sales Offices Throughout the U.S.A.

600 tons, bridge, Route 78, Sec. 2E, Hunterdon County, New Jersey, bids to be opened by the State Highway Department, Trenton, N. J., Nov. 13.

365 tons, state bridgework, LR 1026 I, Allegheny County, Pennsylvania, bids Oct. 30.

187 tons, state bridgework, Dauphin County, Pennsylvania, bids Oct. 30; 378 tons of structurals also required.

140 tons, also concrete piling, Washington State, King County, undercrossing; bids to Olympia, Wash., Oct. 28.

125 tons, Washington State, two girder underpasses, King County; general contract to Allen R. Anderson, Seattle, low at $164,406.

122 tons, state bridge, Susquehanna County, Pennsylvania; bids Oct. 30.

PLATES . . .

PLATES PLACED

2270 tons, carbon hull plates, General Stores Supply Office, Navy, Philadelphia, to C. Itoh & Co. (America) Inc., New York.

1150 tons, carbon steel hull plates, General Stores Supply Office, Navy, Philadelphia, to Phoenix Iron & Steel Co., Harrisburg, Pa.

500 tons, carbon hull plates, General Stores Supply Office, Navy, Philadelphia, to Phoenix Iron & Steel Co., Harrisburg, Pa.

430 tons, carbon hull plates, General Stores Supply Office, Navy, Philadelphia, to C. Itoh & Co. (America) Inc., New York; also 370 tons, hot-rolled carbon sheets to same supplier.

355 tons, carbon steel hull plates, General Stores Supply Office, Navy, Philadelphia, to Phoenix Iron & Steel Corp., Harrisburg, Pa.

245 tons, carbon steel floor plates, General Stores Supply Office, Navy, Philadelphia, to Alan Wood Steel Co., Conshohocken, Pa.

115 tons, stainless, General Stores Supply Office, Navy, Philadelphia, to Eastern Stainless Steel Corp., Baltimore; also, 55 tons, Ingersoll Steel Div., Borg-Warner Corp., Chicago.

PLATES PENDING

530 tons, medium and high tensile steel hull plates, naval shipyard, Bremerton, Wash.; bids Nov. 4.

450 tons, Cedar River pipeline replacement, Seattle; Frank Coluccio Construction Co., Seattle, low at $228,294 for steel; also $237,761 for concrete cylinder.

450 tons, Cedar River replacement line; bids to Seattle postponed to Oct. 15.

300 tons, 1-million-gal. elevated steel water tank; Pittsburgh-Des Moines Steel Co., Seattle, low at $193,177 to Portland, Oreg.

105 tons, carbon steel plates, Corps of Engineers, Chicago; bids Oct. 23.

100 tons or more, 200,000-gal elevated steel water tank; bids to Townsend, Mont., Oct. 24.

PIPE . . .

CAST IRON PIPE PLACED

107 tons, 4 to 8 in., West Slope Water District, Portland, Oreg., to U. S. Pipe & Foundry Co., Seattle.

CAST IRON PIPE PENDING

Unstated, 38,476 ft of 6 in., 3045 ft of 10 in., 48 hydrants; bids to Townsend, Mont., Oct. 24.

STEEL PIPE PENDING

Unstated, 1704 ft of 20 in.; Pacific Mechanical Constructors Inc., Seattle, low at $48,000 to Bremerton, Wash.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Grand Trunk Western, nine 1750-hp road switchers and seven 900-hp yard switchers, to Electro-Motive Div., General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Inland Steel Co., Chicago, 1000 gondola cars, General American Transportation Co., Chicago.

Lehigh Valley, 40 piggyback flat cars, to its Packerton Shops at Lehighton, Pa.

Sacramento & Northern, 10 seventy-ton covered hoppercars, to ACF Industries Inc., New York.

Tidewater-Southern, 50 fifty-ton insulated boxcars, to Pacific Car & Foundry Co., Renton, Wash.

RAILROAD CARS PENDING

Missouri Pacific, one hundred 37-ft insulated refrigerator trailers and 50 chassis for piggyback transportation.

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YOU CAN SAVE TIME, TROUBLE AND COSTS with

Formed Tubes...

★ **Save Time**

We have a huge stock of dies and, when needed, tooling's fast. We also avoid delays by making our own electrically welded steel tubing, sizes from 5/8" to 3" OD.

★ **Save Trouble**

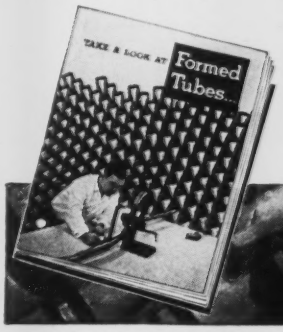
Long, active experience with all tube forming processes and high standards of quality control make sure your orders will be completed *right.*

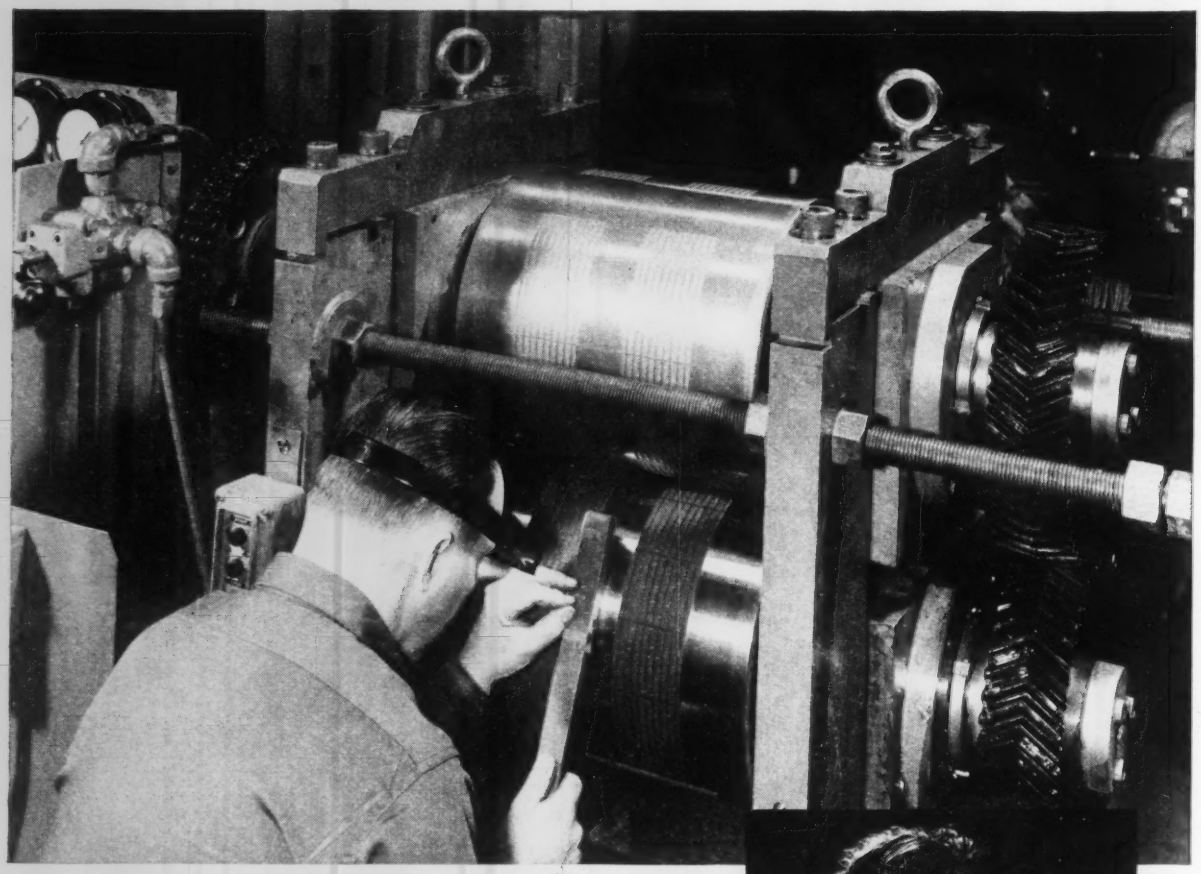
★ **Save Costs**

It's routine for formed tubes parts to deliver top performance, save weight, cut costs. Steel, copper, brass, aluminum or stainless tubing fabricated in 3/8" OD to 6" OD sizes; from 20 to 11 ga. metal.

Formed Tubes, Inc.
1004 Prairie, Sturgis, Michigan

Write for FREE Booklet





"Quality perfection is our business —Standard Steel helps us maintain it—and more"

Alclyde Engraving is in a fascinating business. Chances are the dashboard trim, instrument panels, and scuff plates on your car were embossed on Alclyde rolls—this firm manufactures the major part of all rotary register embossing rolls used by the automotive industry.

The packaging, labeling and plastics industries are also heavy users of Standard-forged, Alclyde-engraved rolls. And in all fields in which design changes are a frequent and vital competitive factor, Alclyde must deliver perfection in a hurry.

That's why we at Standard have geared ourselves to give Alclyde the quality perfection and service it requires. In fact, it's the *service* we can give that all of our customers particularly appreciate. Won't you discuss your quality *and* service requirements with us? Write Dept. 2-K.

"Yes, Standard Steel Works, in supplying us with matched, flame-hardened forged steel embossing rolls, meets our rigid specifications for steel analysis and accurate machining. Nothing is more vital to an engraver than to have perfection all along the line. But in addition, we appreciate the warm, personal relationship which exists between us. The people at Standard appear to be really interested in our business and problems," says Frank W. Broderick, president Alclyde Engraving Co., Chatham, N. J.

Standard Steel Works Division

BALDWIN · LIMA · HAMILTON

BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes

BALDWIN BLH LIMA-HAMILTON

Cleveland drives help control scale and corrosion in steam generating plant

Ten pumps, driven by Cleveland speed reducers, hold a key to successful operation of the $80 million Valley Steam plant of the Los Angeles Department of Water and Power. Clevelands provide those pumps with the correct speed required to feed accurate volumes and proportions of scale control chemicals into the water system.

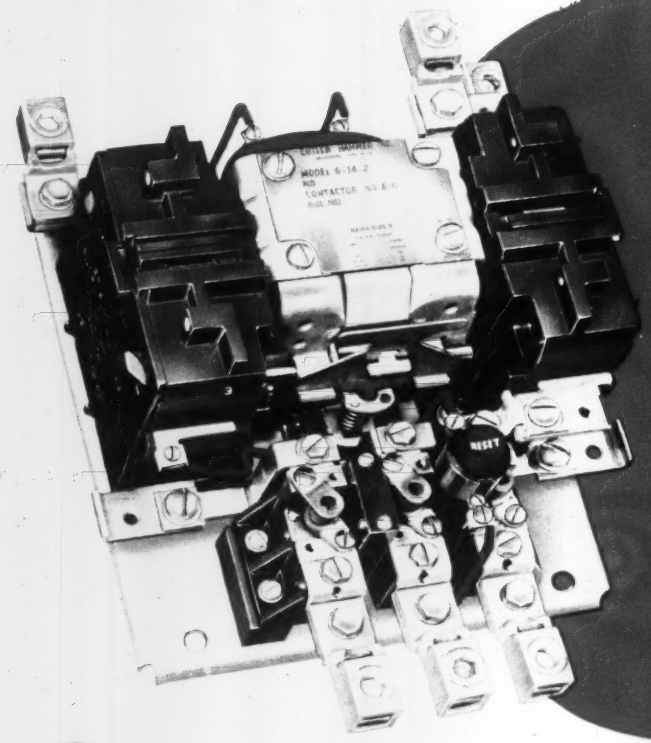
Supplying needed power with smooth, uniform torque, Cleveland speed reducers incorporate case-hardened worms and nickel-bronze gears for years of trouble-free service. That's why Clevelands are found in most applications requiring compact, dependable speed reducers.

See how a Cleveland right-angle speed reducer can benefit your operation or process. Ask for Bulletin 145. Write The Cleveland Worm & Gear Company, 3270 East 80th Street, Cleveland 4, Ohio.

CLEVELAND
Worm Gear
Speed Reducers

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

50 Hp 220 Volts, 100 Hp 440-550 Volts Max. Polyphase



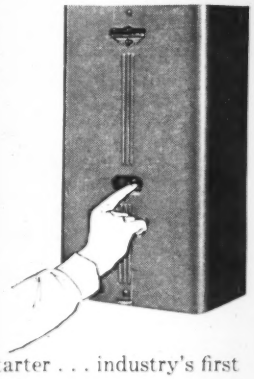
New SIZE 4 STARTER

...another Cutler-Hammer Three-Star achievement

New *compact design saves valuable panel area*

New *parallel contact design provides increased electrical life at full capacity*

New *low mass movable members insure superior mechanical life*



This is the new Cutler-Hammer NEMA Size 4 Starter . . . industry's first large horsepower starter offering all the desired features of the famous Cutler-Hammer Three-Star Motor Control line. Smaller, more compact, this new starter simplifies control panel design and saves valuable panel area. Tests of the new parallel contact structure show vastly improved electrical life even when operated at full capacity. Further, this new design reduces the size and weight of the movable members resulting in less impact wear and unsurpassed mechanical life. We've tested it against all others, why don't you? The new Cutler-Hammer Size 4 Starter ☆ installs easier, ☆ works better, ☆ and lasts far longer. Get all the facts today. Write for the new descriptive bulletin EN125-U-213. Cutler-Hammer Inc., Milwaukee 1, Wisconsin.

Look for these outstanding features . . . you'll find them only in Cutler-Hammer Three-Star Motor Control

- U-shaped cover easily removable for unobstructed inspection and accessibility
- Straight through wiring . . . line terminals at the top, load terminals at the bottom
- New pressure type terminals cut wiring time and effort
- Adjustable overload relays can be set to trip within 3% of full load motor current
- Precision cast overload sensing coils can't lose their accuracy
- Widely desired three-phase, three-coil overload protection is a standard optional feature . . . no special attachments or enclosures
- Indestructible molded magnet coil . . . color coded for positive voltage and frequency identification
- Easily installed convertible electrical interlocks require no special adapters . . . provide up to four extra control circuits
- Available as non-reversing, reversing, and multi-speed contactors and starters in the open type, NEMA 1, and all special purpose enclosures.

CUTLER-HAMMER CONTROL C-H

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